

**LAKE OKEECHOBEE WATER SUPPLY BACKPUMPING
AND
WATER SUPPLY AUGMENTATION
AFTER ACTION REPORT**

FINAL REPORT

December 14, 2001



**Prepared for
Florida Department of Environmental Protection
by
South Florida Water Management District**

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INTRODUCTION AND BACKGROUND

This report has been prepared in compliance with and as a fulfillment of the requirements of the Emergency Final Order (O G C No. 01-1202) issued by the Florida Department of Environmental Protection (Department) on August 3, 2001. The order made provisions for allowing the South Florida Water Management District (District) to take specific necessary action or actions to augment flows to Lake Okeechobee to mitigate the effects of the severe drought conditions experienced across much of the State of Florida during 2001. These actions were intended to increase the stage of Lake Okeechobee, an essential and critical source of water for South Florida.

During the first half of 2001, Florida experienced one of the most severe droughts in recorded history. In spite of the imposition of Phase II (severe) and Phase III (extreme) water restrictions by the District's Governing Board, water supplies were severely impacted in South Florida. These impacts included water levels in Lake Okeechobee falling to historic lows. Since the early portion of the 2001 rainy season experienced rainfalls that were only of average intensity, the Lake was recovering slowly, raising the possibility of even more severe water shortages during the approaching dry season. As a direct result of the drought, the Executive Director of the District declared a Water Emergency on March 27, 2001 which the Governing Board subsequently concurred with in an emergency meeting of the Board on that same date. In response to the declared Water Emergency, the Department found that an emergency existed that required immediate action.

As a result of those findings, the Department issued the first Emergency Final Order (OGC No. 01-0715) on April 27, 2001, in which the District was authorized by the Department to initiate backpumping into the lake through the existing structures at S-2 and S-3 at the south end of Lake Okeechobee. As part of those permitted operations, the order required intensive water quality and biological monitoring programs, the implementation of certain operational constraints, and activities required to offset the potential impacts of the backpumping events which included planting bulrush plants in previously denuded areas and removal of an organic berm in the lake. In addition, the District was directed to work with the agricultural interests in the EAA and the Department of Agricultural and Consumer Services (DACS) to enhance the effective management of the use of pesticides and herbicides.

In the ensuing months, as the drought continued and concerns escalated regarding the impending dry season, the District was authorized by the Department in a second Emergency Final Order (OGC No. 01-1202) dated and issued on August 3, 2001 to continue backpumping as well as allow augmentation of the pumping and gravity flows of water into the lake through the structures at S4, S77, S308, S352, and Culvert 10A. In addition, the District was authorized to install temporary pumps to backpump additional water as required. Operation of the temporary pumps did not occur, however, because increased rainfall during the latter part of the rainy season and gravity inflow through key structures sufficiently raised lake water levels before the pumps became operational. Flow augmentation and backpumping operations, coupled with the increased rainfall during the

latter part of August and early September, sufficiently raised Lake Okeechobee water levels to allow the discontinuance of the activities authorized by the Emergency Final Orders on September 21, 2001.

It should also be noted that several isolated heavy rainstorms resulted in operation of the pumps to mitigate flooding during the Spring and the month of September. Although these events resulted in backpumping water into the lake, these operations were required for flood protection and carried out in accordance with established flood protection pumping criteria. These pumping events were not considered part of the water supply augmentation efforts covered in this report.

WATER QUALITY REPORT

Water quality data obtained during the backpumping and augmentation period are presented in the accompanying tables. In general, the quality of the water entering the lake through the augmentation structures contained lower total phosphorus concentrations than the water entering the lake from other sources. All sampling and analyses were conducted in accordance with the conditions detailed in the Emergency Final Orders of April 27, 2001, and August 3, 2001. All results are summaries or compilations of data previously reported to the Department by the District in prior monthly After Action Reports.

During the period from June 1 through September 21, 2001, backpumping from S2 and S3 contributed 22%, or approximately 325,000 acre-feet of water, of the total inflow into the lake, but only 9%, or 37.9 metric tons, of the total phosphorus (TP) contribution to the lake (Table 1). Flows from all augmentation sources covered in the second Emergency Final Order, including both backpumping and gravity flow, contributed 39% of the flow and 25% of the TP when compared to all water sources contributing to the lake during that time period. These relative contributions resulted in a flow weighted mean concentration of TP from all backpumping and augmentation sources that averaged 146 ppb, whereas the flow weighted mean concentration of TP entering the lake from all sources, including the backpumping and augmentation flows, averaged 228 ppb.

Calculated loads for Total Nitrogen (TN) indicate that the load of nitrogen entering the lake for the augmentation period coming from the augmentation structures represented 46% of the total load from all sources. The flow weighted mean concentration of TN entering the lake from all sources during the period was 2.53 mg/l (2,532 ppb), whereas the flow weighted mean concentration of TN from the flows coming through the structures being used for water supply backpumping and augmentation was 2.99 mg/l.

Table 2 reiterates flow and load data for each structure broken down into monthly intervals for the total augmentation and backpumping period.

The data summarized in Tables 1 and 2 are graphically put into perspective for the lake as a whole by the figures shown in Figure 1 through Figure 4. Figure 1 indicates the flow weighted concentration of TP from each inflow into the lake including those presented in Tables 1 and 2. The concentrations indicated in Figure 1 are then multiplied by the total

flow to calculate the load of TP entering the lake from each source. Those loads are shown in Figure 2. Figure 3 likewise indicates the flow weighted concentration of TN entering the lake from each source, and Figure 4 shows the load of TN based on the flow weighted concentration and the total flow from each source.

A monthly summary of lake stage and rainfall reported by tributary basins is provided in Table 3. Individual daily flow and pump operation logs have been provided in the monthly After Action Reports previously submitted. A graphical representation of lake stage and regulation limits for the period from January 1, 2000 to the termination of the backpumping and flow augmentation activities on September 21, 2001, is provided in Figure 5.

The monitoring programs specified by the Emergency Final Orders also required additional water quality monitoring of the inflows into the lake for parameters other than nutrients. Sampling stations used to collect water quality monitoring samples are indicated on the map in Figure 6. The results of those monitoring activities are reported in Tables 4 through 23.

Tables 4 through 9 specify the pesticides detected at each structure during the sampling period. Any pesticide that had a positive value reported at any time at any location during the monitoring program are reported for each sampling event at each sampling point, even if the pesticide was not found at that particular sampling point. The pesticide results were reported in this manner to enable easier cross comparisons between sampling events and locations. Tables 4 through 9 list only those pesticides for which at least one positive value was obtained during the monitoring required for the backpumping and augmentation operations, whereas Table 10 provides a complete list of all the pesticides for which analyses were performed. A BDL value in Tables 4 through 9 indicates that the concentration of the pesticide was below the analytical detection limit for that specific pesticide at that sampling event. No pesticide concentrations found exceeded Class I water quality standards.

Trace level mercury monitoring for all structures involved in augmentation flows to Lake Okeechobee are reported in Table 11. In no case was the state criterion of 12 ng/l total mercury exceeded for any water sample analyzed and reported. A "ND" value in Table 10 indicates that no data are available for that sample due to quality control issues with that particular datum. A value preceded by a less-than symbol (<) for a sample indicates that the results for that analysis were below the method detection limit for that analyte; the value reported for those analyses is the detection limit for that particular determination.

Summaries of the water quality data for each sampling station are presented in tables 12 through 23. These summaries indicate that there were no significant violations of class I water quality standards at any location except for variations from the Dissolved Oxygen (DO) standard and a few exceedances of the standard for iron. Concentrations below the 5 mg/l DO standard are common in ambient South Florida surface waters and do not necessarily indicate adversely impacted water quality. This standard is currently under review by the Department and it is anticipated that it will be revised to more accurately

reflect naturally occurring conditions in South Florida. The exceedances observed for iron were in excess of the Class I standard but were still within the Class III standard. Since the water samples were collected on the up-stream or canal side of the structures, and thus were collected in Class III waters, there is a question about which standard should apply. Furthermore, iron in concentrations greater than the Class I standard of 0.3 mg/l in surface water are generally in the form of particulate iron associated with suspended sediments and should settle out in the lake, allowing the water to meet Class I standards in that water body before the water reaches any public water supply intake point. A value preceded by a less-than symbol (<) for a sample indicates that the results for that analysis were below the method detection limit for that analyte; the value reported for those analyses is the detection limit for that particular determination.

BIOLOGICAL MONITORING REPORT

OVERVIEW

The Department required that the District expand its existing program of biological monitoring in the lake in order to identify any ecological impacts of backpumping. The District had the benefit of nearly two years of biological monitoring background data to assist in the identification of potential effects. The focus of the monitoring, as detailed in the two Emergency Final Orders (OGC No. 01-0715 and OGC No. 01-1202) provided by the Department, was on submerged aquatic vegetation (SAV) and water transparency. The lake's SAV is a valued ecosystem component that provides habitat for fish and other aquatic biota. Submerged aquatic vegetation is a sensitive indicator of water quality because its aboveground tissues are in direct contact with the lake water. Research on Lake Okeechobee and in other shallow freshwater ecosystems has documented that underwater light availability is a prime determinant of SAV growth. Therefore, the biological monitoring program also included a detailed analysis of underwater light in the southern region of the lake in the proximity of the S2 and S3 pump stations, as well as other stations that could be used as "reference" locations for comparative purposes.

In summary, biological monitoring indicated no negative impacts of the backpumping operations on SAV or water transparency. There were typical variations in SAV occurrence with season and location, similar to what has previously been documented in Lake Okeechobee, and changes in water transparency associated with increased water depths, lake-wide effects of wind, and lake-wide changes in dissolved organic color. However, none of these changes were associated with the emergency water supply backpumping operations. These results do not indicate that backpumping will never have negative ecological impacts on the Lake, just that in this particular case such effects were not observed as of the date of this report.

METHODS

The District, in a document dated August 1, 2001 previously supplied the Department with a detailed description of the biological monitoring program. Therefore only a brief overview is included here. Biological monitoring included monthly assessment of the

biomass, spatial extent, and taxonomic composition of SAV at over 50 sites around the south, west, and north perimeter of the lake, and reporting of this information in the form of GIS maps. The monitoring also included weekly measurements of water transparency with a Secchi disk; these measurements were restricted to locations at the lake's southern end. The primary aim of transparency monitoring was to have an "early warning" of impacts on light conditions that might give rise to future declines in plant growth. As indicated above, no such early warnings ever arose.

Monitoring the Status of SAV

To evaluate SAV status over the period when water supply backpumping and augmentation occurred and when the second Emergency Final Order (OGC No. 01-1202) was in effect (August and September 2001), the District increased the frequency of its SAV sampling program from quarterly to monthly. The sampling sites occur in the south, west, and north near-shore areas that are shallow enough to support plants when conditions are favorable for their growth. The sampling sites occur along transects from shoreline out to deeper water, with three sites per transect and a total of 45 sites (depending on lake stage).

Evaluation of Underwater Light Availability

The SAV monitoring was accompanied by more frequent (weekly) sampling of underwater light availability at locations that were expected to experience inputs of water from backpumping and augmentation (i.e., the 21 stations around the south and southwest edge of the lake, from Pelican Bay to Mayaca Cut). This sub-network includes transects extending outward into both South Bay and the shallow bay to the west of Ritta Island, lakeward of the S2 and S3 pump stations, respectively. At the 21 sites, District staff carried out sampling during morning hours (to minimize the influence of afternoon thunderstorms and associated wind-induced mixing and sediment resuspension) on a weekly basis in August and September. The sampling method was based on past experience that the simplest and most useful approach is to measure Secchi disk transparency and total depth. The ratio of Secchi / total depth then is an indicator of underwater light conditions for plant growth. Sites with ratios in excess of 0.5 typically have well above the critical irradiance needed for plant growth, while sites with ratios below 0.25 might be considered "stressed" from the perspective of plant growth.

AUGUST RESULTS

Submerged Aquatic Vegetation

The SAV community was sampled on August 21 (Figure B1). A total of 21 sites had SAV and 14 sites did not. Sites with SAV occurred in shallower water closer to the shore. The plants were responding to increased lake stages with the appearance of small *Chara* (shrimp-grass) plants around the shoreline at many of the sites that previously were dry (Figure B4). Two sites along the southwest shore also had a high biomass of *Vallisneria* (eelgrass). The pattern of SAV occurrence at this time was very similar to what was

observed at the start of the growing season last year and it did not indicate any effects of water supply backpumping.

Transparency

Transparency was measured on August 7, 14, and 21 at sites located along 7 transects parallel to the lake shore (Figures B2-B4), including Pelican Bay (one transect), South Bay (three transects), and three transects west of Ritta Island. On all three occasions, percent Secchi depth was greater than 75% (high light for plant growth) at most sites that were sampled. Of the 51 measurements (one transect in South Bay was dry and not sampled, and the innermost station along the transect near the Mayaca Cut also was dry), there were only 4 cases of percent Secchi below 50% (two each on August 14 and 21). Field crew reported that these lower values were associated with wind-driven mixing of the water column and sediments at exposed locations. The percent Secchi data do not indicate any particular influences of backpumping on water quality during the month of August. It is noteworthy that the lake has displayed a high degree of color in the water, probably reflecting the presence of humic materials. However, this color was observed system-wide (as far north as the Okeechobee pier), as opposed to just the southern region of the lake.

SEPTEMBER RESULTS

Submerged Aquatic Vegetation

The SAV community was sampled again in the 3rd week of September (Figure B5). At that time 26 sites had sparse SAV (<100 g/m² dry weight), one site had dense SAV (>100 g/m² dry weight), and 27 sites had no SAV. Dominant types of SAV were *Chara* spp. (shrimpgrass) and *Vallisneria americana* (eelgrass). The number of sites with SAV in September was somewhat higher than in August (when 21 out of 35 sampled sites had plants), but the number of sites with dense SAV decreased from 3 in August to 1 in September. The results of SAV sampling did not indicate any causal relationships between plant distribution or biomass and water supply backpumping.

Transparency

During September, water transparency (Figures B6-B9) continued to be monitored using the Secchi disk method at stations located along 7 transects perpendicular to the lake shore in Pelican Bay (one transect), South Bay (three transects), and west of Ritta Island (three transects). A total of 19 stations were monitored on September 4, 11, 18, and 25. Dense emergent vegetation prevented sampling with the Secchi disk at certain locations / dates. On September 4, 13 of 16 sampled sites had good or fair conditions for plant growth and three sites had insufficient light for plant growth, based on the Secchi to total depth ratios. This was very similar to the condition observed on August 21. Nearly identical results were obtained on September 11. On September 18, conditions changed – only 8 of 17 sites had fair to good light conditions, and 10 sites had insufficient light for plant growth. Similar results persisted to September 25. The decrease in light availability for plant growth was observed at other locations in the lake during late September, and was

attributed to rising lake stage, coupled with a generally high level of dissolved organic material in the water. The data collected here do not indicate any causal linkage between the reduced light availability for plants and water supply backpumping.

WATER QUALITY AND ECOSYSTEM ENHANCEMENT/RESTORATION

As part of the conditions of the Emergency Final Order, several enhancement projects have been accomplished in the lake. Prior to the initiation of backpumping, approximately 12,000 bulrush plants had been planted in the lake as specified in Emergency Final Order 01-0715. In addition, the District has budgeted funds to plant approximately 50,000 additional bulrush plants but has not yet done so due to the return to normal lake stages. The planting work is anticipated to commence when water levels in the lake recede sufficiently to allow the proposed activity.

Additionally, the District was directed to contribute \$200,000 to the Florida Fish and Wildlife Conservation Commission's project to remove the organic berm in the western portion of the lake and transfer the material to several wildlife islands. In actuality, the District has contributed \$400,000 to the enhancement project and it has now been completed.

The District continues to actively work with the agricultural interests in the EAA in cooperation with DACS to promote and more closely manage the use of pesticides and herbicides. These activities are partially conducted as enhancements of the active Best Management Practices program the District promulgates in the EAA.

Emergency Final Order No. 01-1202 directed that the District reimburse the City of Belle Glade and the City of South Bay public water supply utilities for any monthly incremental increases in water treatment costs directly attributable to District operation of the S-2 and S-3 pump stations during the duration of the backpumping operations. As of this date, the City of Belle Glade has supplied the District with the necessary documentation of additional costs and treatment and has been reimbursed by the District. The Cities of South Bay and Pahokee are still in the process of providing the necessary documentation required to receive reimbursement which will be forthcoming upon the District's review and acceptance of that documentation.

During the Spring of 2000, the District performed a lake recession that removed approximately 150 metric tons of TP from the lake (Table 24). The backpumping and augmentation operations performed under the emergency action order contributed 38 metric tons of TP, resulting in a net loss of 112 metric tons of TP from the lake when the two actions are compared.

In addition, although not required by the Emergency Final Orders, the District is financially participating in cooperation with other governmental entities in the maintenance dredging of the Industrial Canal, which is currently in progress, and the planned dredging of three marinas in the southern part of the lake. It is anticipated that these dredging

operations will remove significant quantities of nutrient containing sediments resulting in a net reduction of nutrient loads. This reduction should have an eventual beneficial effect on the water quality in the lake.

CONCLUSION

Analysis of the data collected in the Water Quality and Biological Monitoring programs associated with the Emergency Final Orders did not indicate adverse impacts to Lake Okeechobee attributable to the emergency water supply backpumping and flow augmentation operations.

The District, in partnership with the Department of Environmental Protection and the Department of Agricultural and Consumer Services, is continuing to implement water quality improvement and lake restoration projects consistent with the Lake Okeechobee Protection Act and the Lake Okeechobee SWIM Plan.

Table 1. Final Summary for June 1, 2001 through September 21, 2001 Water Supply Backpumping and Water Supply Augmentation Sites and for Lake-wide All Inflow.

Flow

STATION	Total Inflow		% of lake-wide inflow total
	cfs	acre-feet	
S2	98,882	196,129	13%
S3	65,324	129,569	9%
CULV10A (L8)	37,753	74,881	5%
S77	34,916	69,255	5%
S308	45,860	90,962	6%
S4	6,072	12,044	1%
S352	1,455	2,886	0%
Sum for above sites	290,262	575,726	39%
% of lake-wide all inflow	39%	39%	
(Lake-wide all inflow total)	741,275	1,470,298	100%

Total Phosphorus (TP)

STATION	Total Phosphorus (TP)		% of lake-wide inflow total
	loads (metric tons)	FWMC (ppb)	
S2	23.96	99.0	6%
S3	13.95	87.3	3%
CULV10A (L8)	9.52	103.0	2%
S77	13.13	153.8	3%
S308	40.09	357.3	10%
S4	2.29	153.9	1%
S352	0.82	229.2	0%
Sum for above sites	103.76	146.1	25%
% of lake-wide all inflow	25%		
(Lake-wide all inflow total)	413.52	228.0	100%

Total Nitrogen (TN)

STATION	Total Nitrogen (TN)		% of lake-wide inflow total
	loads (metric tons)	FWMC (ppb)	
S2	894	3,697	19%
S3	559	3,499	12%
CULV10A (L8)	206	2,227	4%
S77	169	1,977	4%
S308	238	2,118	5%
S4	40	2,669	1%
S352	24	6,752	1%
Sum for above sites	2,129	2,999	46%
% of lake-wide all inflow	46%		
(Lake-wide all inflow total)	4,592	2,532	100%

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Table 2. Monthly summary: Water Supply Backpumping and Augmentation Sites and All Lake Wide Inflows, June 1, 2001 through September 21, 2001

Notes: All flow data are preliminary estimations.
S2, S3, S4, and S352 loads are calculated using the auto sampler concentrations.
CULV10A, S77, and S308 loads are calculated interpolating grab concentrations.

June 1 -30

STATION	FLOW		Total Phosphorus (TP)		Total Nitrogen (TN)	
	cfs-days	acre-feet	loads (metric tons)	FWMC (ppb)	loads (metric tons)	FWMC (ppb)
S2	8,142	16,149	2.38	119.6	75.25	3,777.5
S3	3,825	7,587	0.48	51.3	35.30	3,772.5
CULV10A (L8)	930	1,845	0.30	131.7	3.53	1,551.8
S77	18,744	37,178	6.06	132.1	92.25	2,011.5
S308	7,452	14,781	4.27	234.2	33.22	1,822.1
S4	0	0	0	N/A	0	N/A
S352	0	0	0	N/A	0	N/A
Sum for above sites	39,093	77,540	13.49	141.1	239.55	2,504.6
All lake-wide total	44,539	88,341	16.24	149.0	269.28	2,471.2

July 1 - 31

STATION	FLOW		Total Phosphorus (TP)		Total Nitrogen (TN)	
	cfs-days	acre-feet	loads (metric tons)	FWMC (ppb)	loads (metric tons)	FWMC (ppb)
S2	32,393	64,251	7.38	93.1	301.12	3,799.5
S3	19,748	39,170	2.81	58.1	168.86	3,495.0
CULV10A (L8)	7,373	14,624	2.02	111.8	32.81	1,819.1
S77	13,904	27,578	6.12	179.9	66.42	1,952.5
S308	14,308	28,380	9.19	262.6	60.42	1,725.9
S4	0	0	0	N/A	0	N/A
S352	0	0	0	N/A	0	N/A
Sum for above sites	87,727	174,003	27.51	128.2	629.64	2,933.6
All lake-wide total	178,404	353,860	122.22	280.0	1,138.51	2,608.4

August 1 - 31

STATION	FLOW		Total Phosphorus (TP)		Total Nitrogen (TN)	
	cfs-days	acre-feet	loads (metric tons)	FWMC (ppb)	loads (metric tons)	FWMC (ppb)
S2	37,706	74,789	9.09	98.5	347.55	3,767.4
S3	19,964	39,598	4.55	93.2	143.55	2,938.9
CULV10A (L8)	17,644	34,996	5.18	120.0	114.43	2,650.9
S77	2,268	4,499	0.96	172.4	10.22	1,842.0
S308	14,649	29,056	18.50	516.3	105.94	2,956.0
S4	5,042	10,001	1.82	147.6	31.39	2,544.4
S352	1,455	2,886	0.82	229.2	24.04	6,752.3
Sum for above sites	98,729	195,825	40.91	169.4	777.12	3,217.3
All lake-wide total	267,956	531,483	152.81	233.1	1,831.83	2,794.2

September 1 - 21

STATION	FLOW		Total Phosphorus (TP)		Total Nitrogen (TN)	
	cfs-days	acre-feet	loads (metric tons)	FWMC (ppb)	loads (metric tons)	FWMC (ppb)
S2	20,640	40,940	5.11	101.3	170.41	3,374.6
S3	21,787	43,213	6.12	114.8	211.49	3,967.7
CULV10A (L8)	11,806	23,417	2.02	70.0	54.94	1,902.0
S77	0	0	0	N/A	0	N/A
S308	9,451	18,746	8.12	351.3	38.01	1,644.0
S4	1,030	2,043	0.47	185.0	8.26	3,279.0
S352	0	0	0	N/A	0	N/A
Sum for above sites	64,714	128,358	21.84	138.0	483.11	3,051.4
All lake-wide total	250,376	496,614	122.25	199.6	1,352.35	2,207.7

Figure 1.

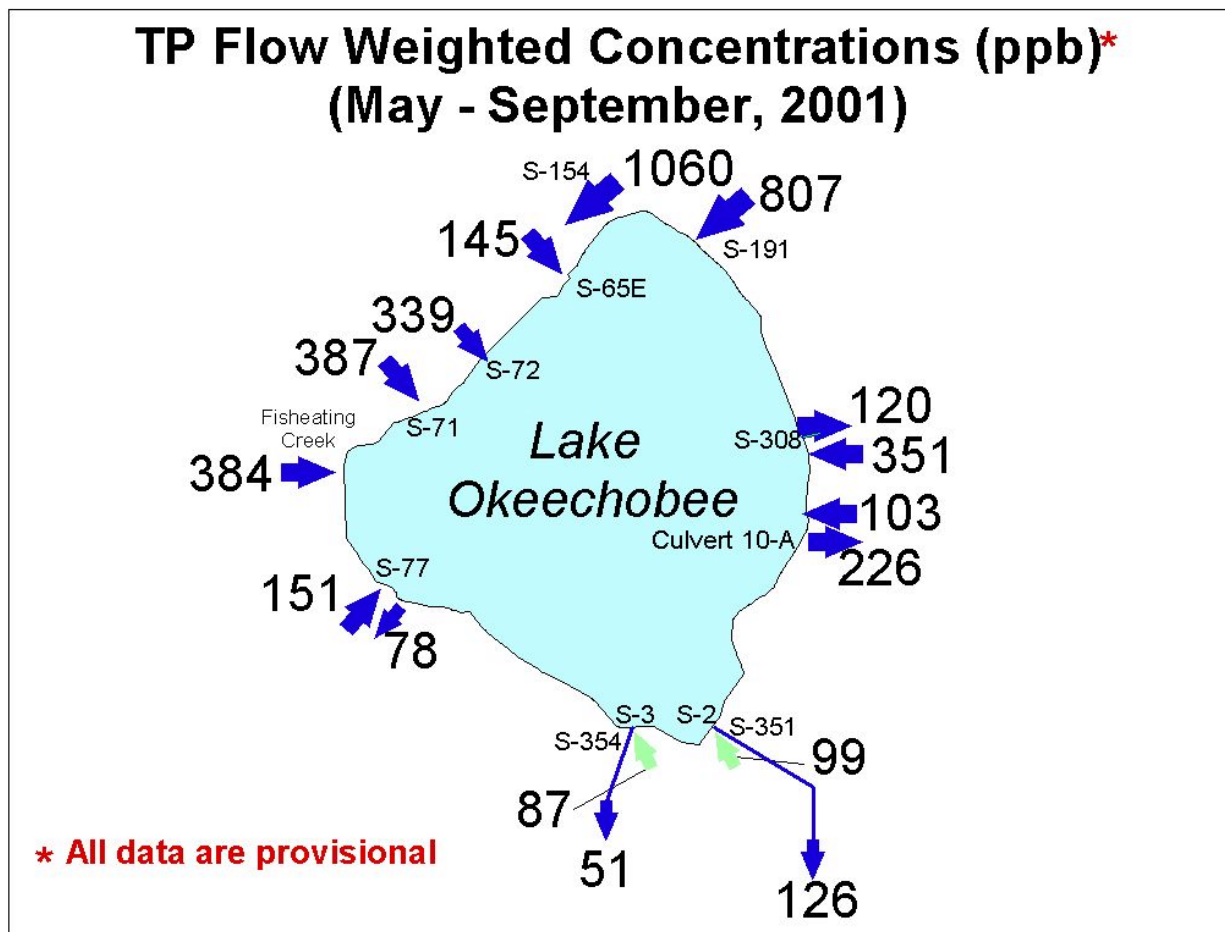


Figure 2

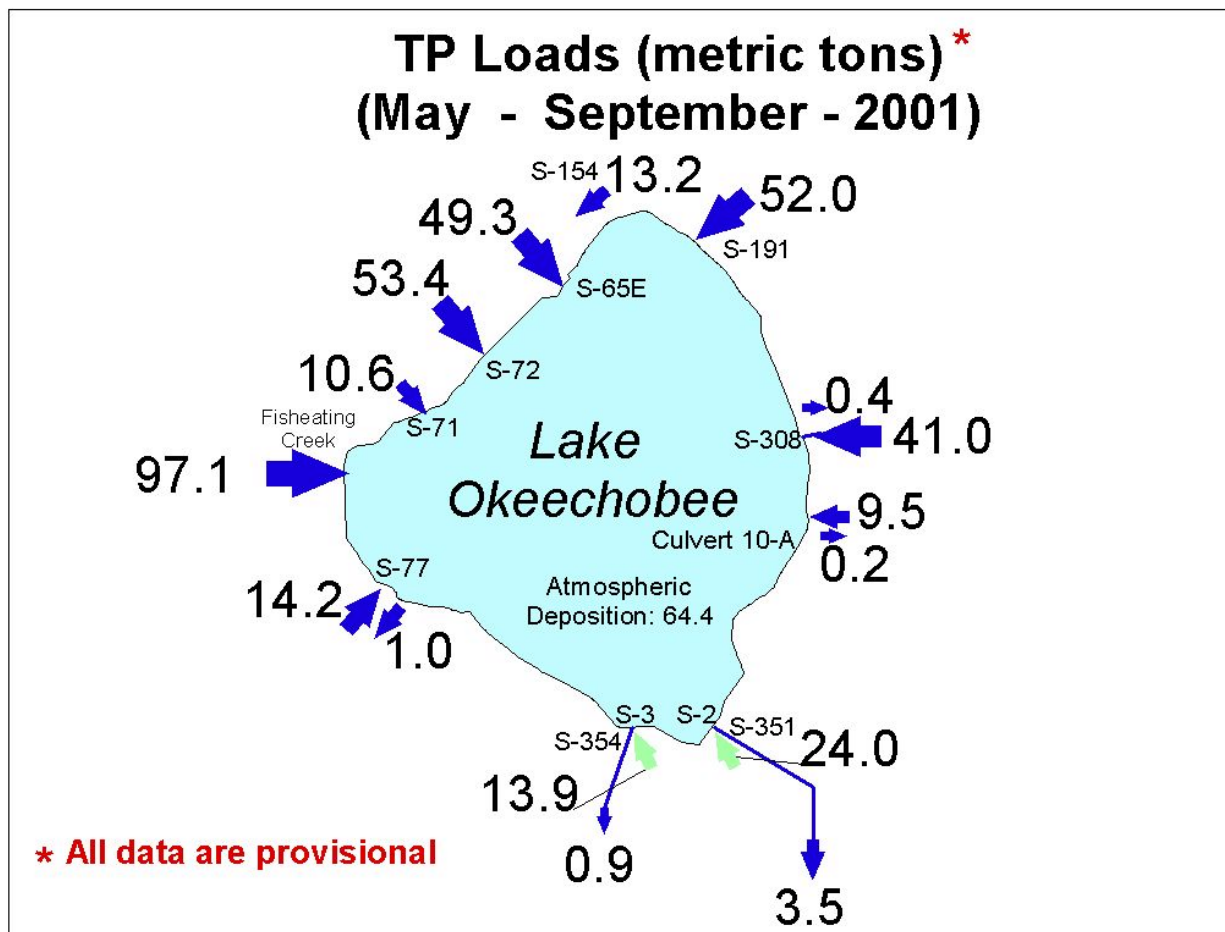


Figure 3.

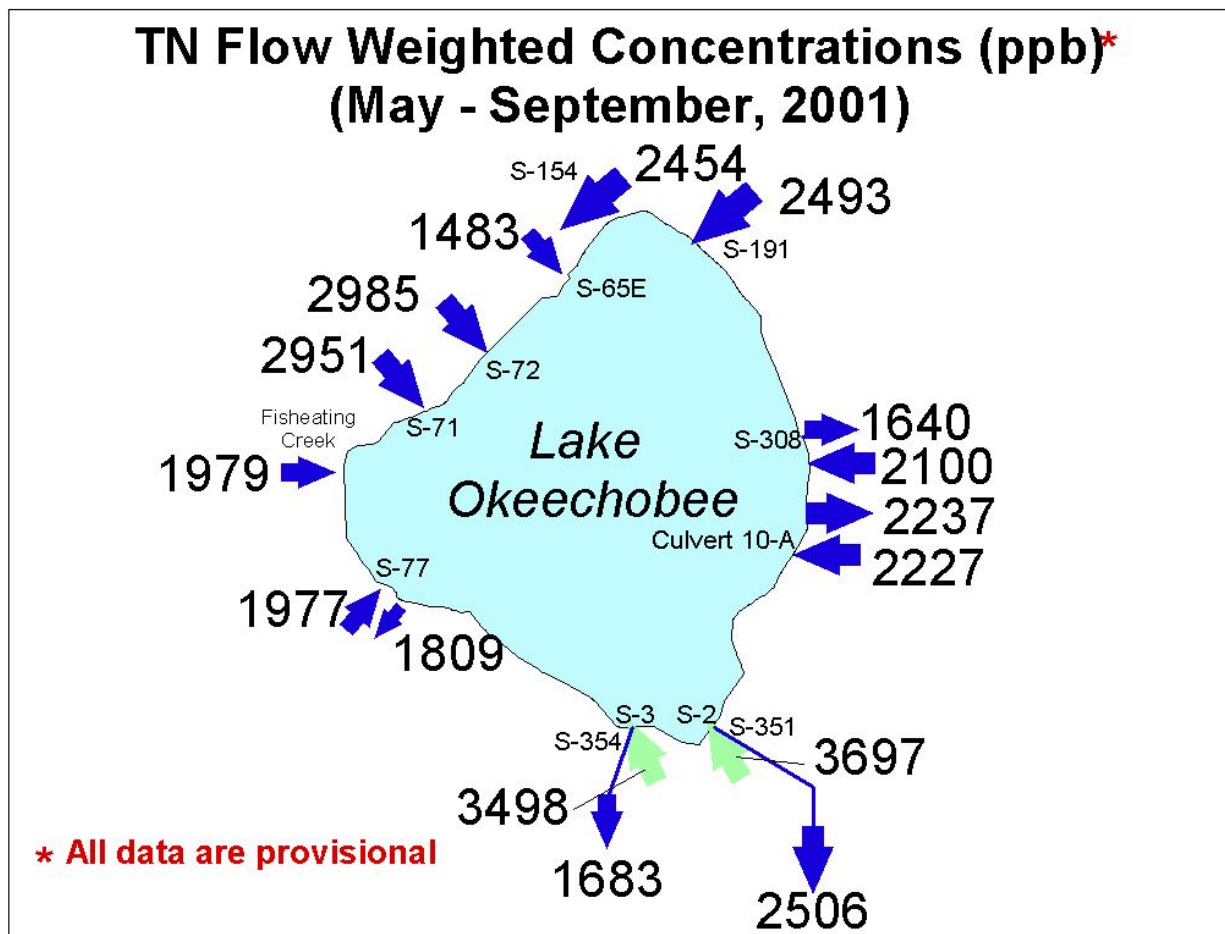


Figure 4.

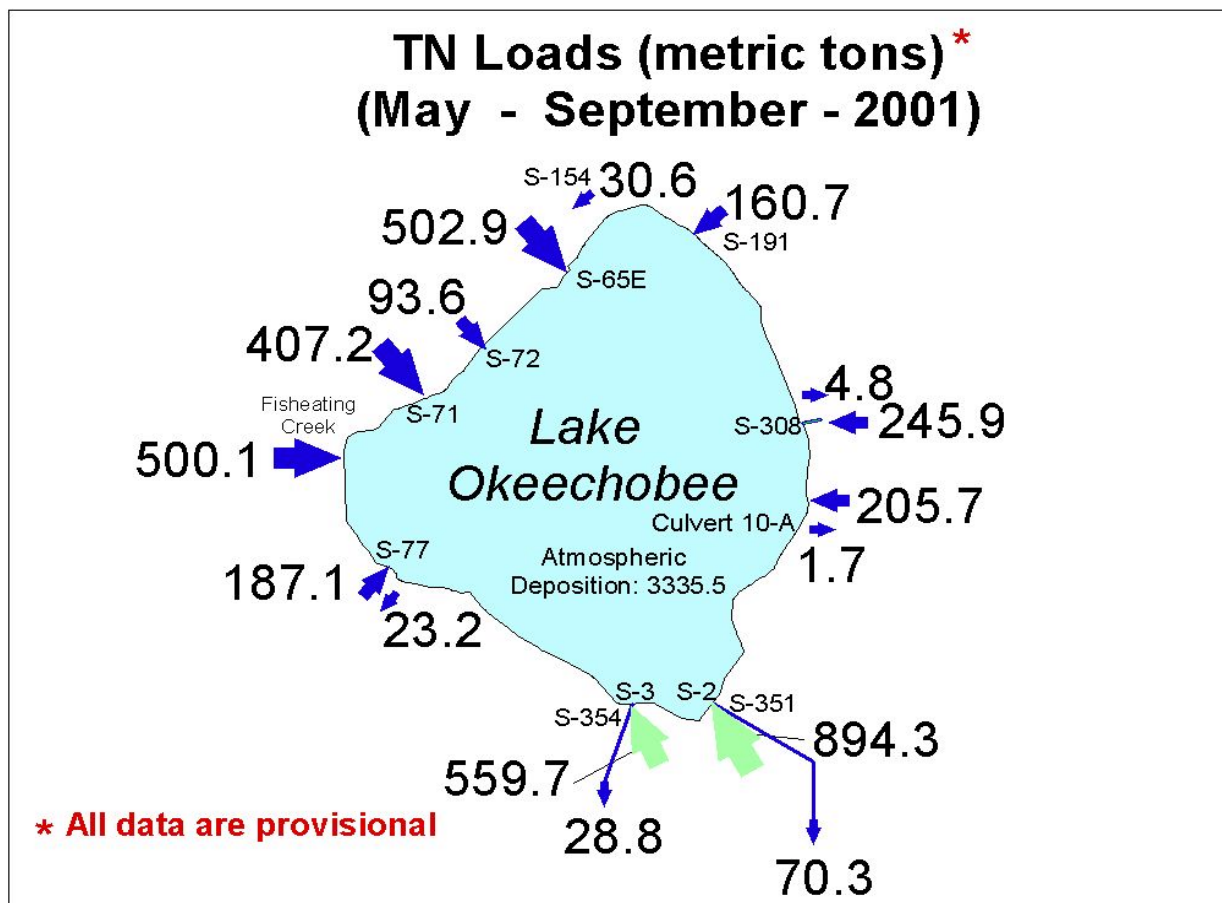


Table 3. Lake Stage and Rainfall for Lake Okeechobee and Vicinity.

Stage: COE Data. Average-daily lake average. In feet-NGVD.
 Rainfall: Monthly Sum of SFWMD Provisional 24-Hour Rainfall In Inches
 Ending 7am EST (8am EDT) On The Indicated Date

DATE	STAGE (feet)		BASIN MONTHLY RAINFALL (inches)							
	beginning	ending	EAA West	EAA East	Lake Okeechobee	Upper Kissimmee	Lower Kissimmee	East Caloos.	MartinSt.Lucie County	Palm Beach County
June 1 -30	9.01	9.27	6.51	6.12	5.69	8.04	6.58	6.56	7.44	6.56
July 1 - 31	9.26	10.53	7.14	8.24	9.07	8.44	8.89	13.44	11.71	9.41
August 1 - 31	10.61	11.98	4.53	5.78	6.19	6.67	4.53	8.48	8.18	7.95
September 1 - 21	11.96	13.56	8.21	6.24	7.80	9.87	8.47	9.04	7.31	9.86
sum (June1 -Sept 21)	9.01	13.56	26.39	26.38	28.75	33.02	28.47	37.52	34.64	33.78

Figure 5

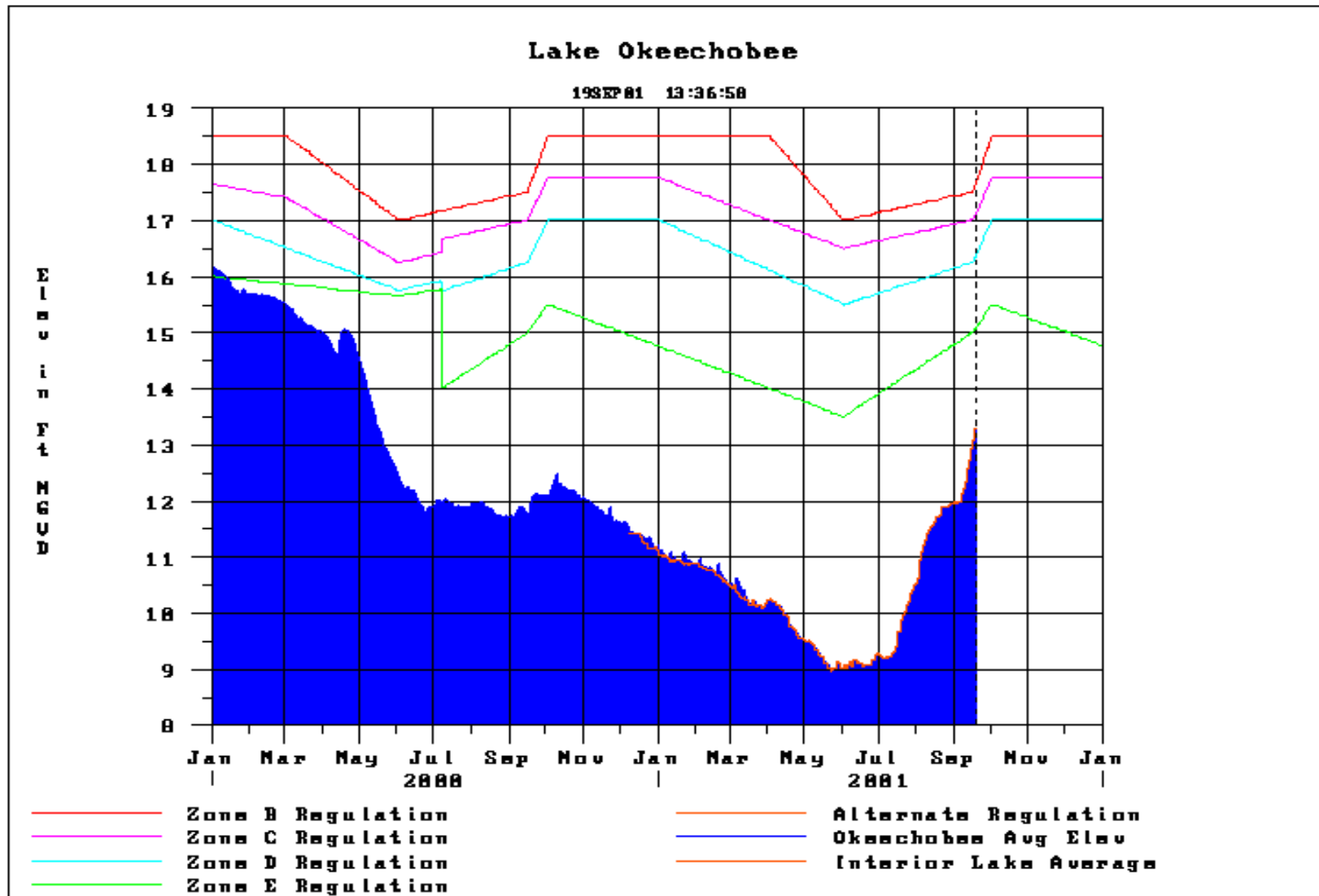


Figure 6. Lake Okeechobee Water Quality Sampling Locations

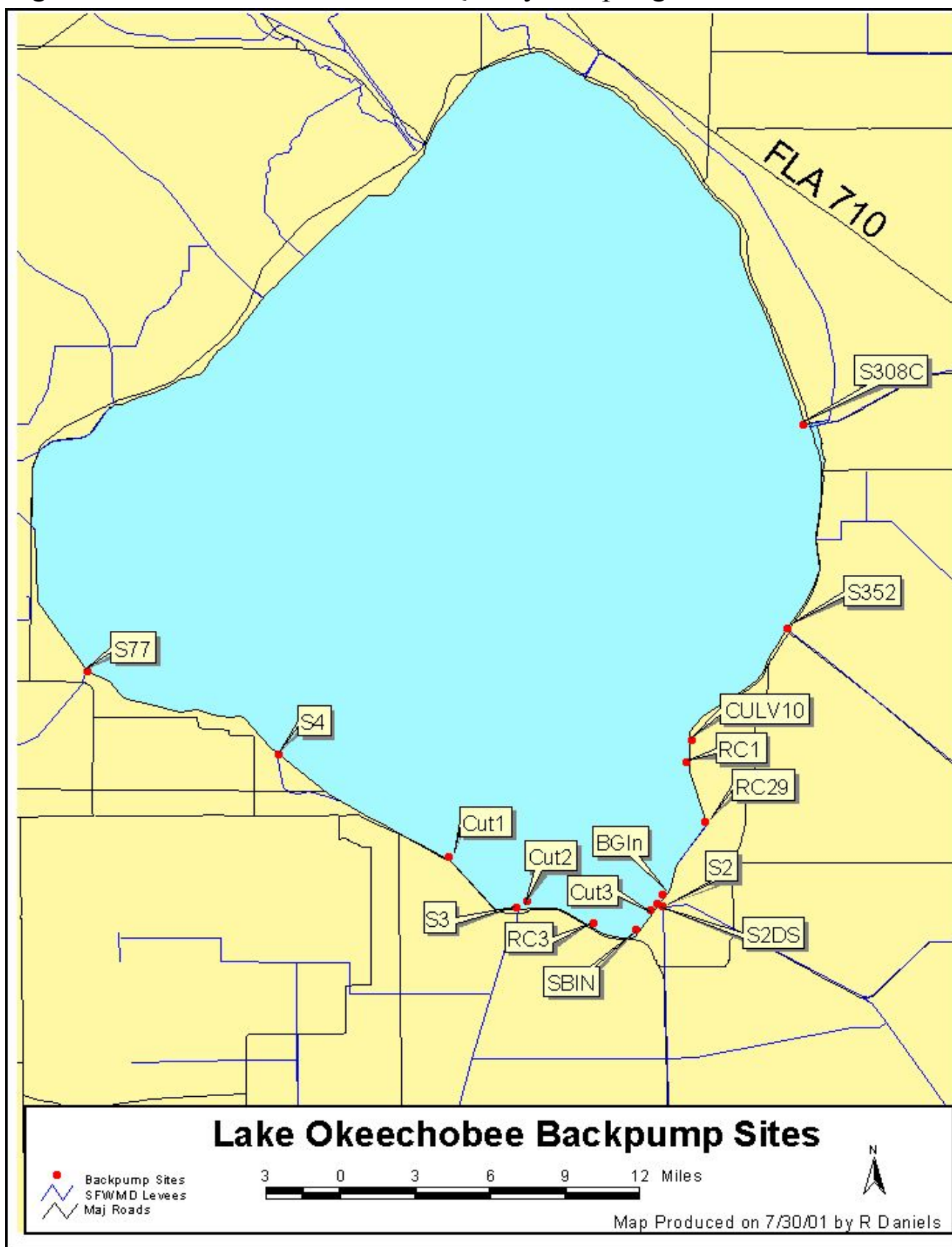


Table 4. Pesticides at S2: June 1, 2001 through September 21, 2001 Backpumping Events.

Parameters	Sampling Dates												FAC 62-302
	06/01/01*	06/08/01	06/12/01*	06/25/01*	06/28/01*	07/10/01	07/16/01	07/20/01	07/25/01	07/27/01*	07/27/01*	08/02/01, 08/03/01*	Class I Criteria
ametryn (µg/L)	0.013	0.057	0.065	0.11	0.085	0.046	0.065	0.078	0.16	0.072	0.072	0.046	
atrazine (µg/L)	0.44	BDL	0.98	9.4	2.5	0.66	0.36	0.41	1.9	0.28	0.28	0.16	
atrazine desethyl (µg/L)	0.083	0.16	0.10	0.18	0.091	0.059	0.053	0.067	0.12	0.031	0.031	0.025	
atrazine desisopropyl (µg/L)	0.024	0.033	0.030	0.032	0.015	0.010	0.013	0.018	0.032	0.018	0.018	BDL	
bromacil (µg/L)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
diazinon (µg/L)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
hexazinone (µg/L)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
malathion (µg/L)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	less than or equal to 0.1 mg/L
gamma-BHC (Lindane) (µg/L)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
metolachlor (µg/L)	BDL	BDL	BDL	BDL	BDL	BDL	0.17	BDL	BDL	BDL	BDL	BDL	
norflurazon (µg/L)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
parathion methyl (µg/L)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
simazine (µg/L)	0.019	0.021	0.021	0.043	0.012	BDL	BDL	BDL	0.019	BDL	BDL	0.027	

* average of duplicate values

BDL = below detection limit

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Table 5. Pesticides at S3: June 1, 2001 through September 21, 2001 Backpumping Events.

Parameters	Sampling Dates															FAC 62-302 Class I Criteria
	06/05/01*	06/06/01*	06/07/01*	06/08/01*	06/10/01*	06/12/01	06/22/01*	06/25/01*	06/28/01*	07/12/01*	07/16/01	07/20/01	07/25/01*	07/27/01	08/02/01, 08/03/01	
ametryn (µg/L)	0.014	BDL	BDL	0.046	0.065	BDL	0.075	0.084	0.061	0.048	0.051	0.062	0.052	0.038	0.04	
atrazine (µg/L)	0.43	1.7	1.6	BDL	0.83	0.83	0.51	0.59	5.9	1.9	0.25	0.37	0.27	0.14	0.1	
atrazine desethyl (µg/L)	0.071	0.17	0.16	0.15	0.13	BDL	0.01	0.085	0.12	0.093	0.048	0.060	0.042	BDL	0.025	
atrazine desisopropyl (µg/L)	0.018	0.034	0.029	0.030	BDL	BDL	0.017	0.013	0.021	0.021	0.015	0.017	0.013	BDL	BDL	
bromacil (µg/L)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
diazinon (µg/L)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
hexazinone (µg/L)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
malathion (µg/L)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0.040	BDL	BDL	BDL	less than or equal to 0.1 mg/L
gamma-BHC (Lindane) (µg/L)	BDL	BDL	BDL	BDL	BDL	0.0058	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
metolachlor (µg/L)	BDL	0.14	0.14	0.11	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
norflurazon (µg/L)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
parathion methyl (µg/L)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
simazine (µg/L)	0.014	0.014	0.014	0.016	BDL	BDL	BDL	BDL	0.025	BDL	BDL	BDL	BDL	BDL	BDL	

* average of duplicate values

BDL = below detection limit

Table 6. Pesticides at S308, S77 and Culvert 10A at L8: June 1, 2001 through September 21, 2001 Backpumping Events.

Station	S308	S77	L8	FAC 62-302
Date	07/10/01	07/10/01	07/10/01*	Class I Criteria
Parameter				
ametryn (µg/L)	BDL	0.060	0.11	
atrazine (µg/L)	BDL	0.10	BDL	
atrazine desethyl (µg/L)	BDL	0.026	0.012	
atrazine desisopropyl (µg/L)	0.014	0.011	BDL	
bromacil (µg/L)	0.51	0.26	BDL	
diazinon (µg/L)	BDL	BDL	0.049	
hexazinone (µg/L)	BDL	0.027	BDL	
gamma-BHC (Lindane) (µg/L)	BDL	BDL	BDL	
malathion (µg/L)	BDL	BDL	BDL	less than or equal to 0.1 mg/L
metolachlor (µg/L)	BDL	BDL	BDL	
norflurazon (µg/L)	1.0	0.25	BDL	
parathion methyl (µg/L)	BDL	BDL	BDL	
simazine (µg/L)	0.096	0.040	BDL	

* average of duplicate values

BDL = below detection limit

Table 7. Pesticides at S2 Downstream and S3 Downstream: June 1, 2001 through September 21, 2001 Backpumping Events.

Station	S2DOWN					S3DOWN					FAC 62-302
Date	07/17/01	07/20/01	07/24/01	07/27/01	08/02/01, 08/03/01	07/18/01*	07/20/01	07/24/01	07/27/01	08/02/01, 08/03/01	Class I Criteria
Parameter											
ametryn (µg/L)	0.090	0.072	0.065	0.063	0.046	0.049	0.065	0.058	0.043	0.05	
atrazine (µg/L)	0.48	0.33	0.49	0.29	0.150	0.26	0.34	0.24	0.15	0.1	
atrazine desethyl (µg/L)	0.061	0.052	0.033	0.031	0.027	0.050	0.054	0.037	0.019	0.02	
atrazine desisopropyl (µg/L)	0.024	0.017	0.012	0.017	BDL	0.010	0.017	0.010	0.0098	BDL	
bromacil (µg/L)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
diazinon (µg/L)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
hexazinone (µg/L)	0.025	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
malathion (µg/L)	BDL	BDL	BDL	BDL	BDL	0.030	0.031	BDL	BDL	BDL	less than or equal to 0.1 mg/L
gamma-BHC (Lindane) (µg/L)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
metolachlor (µg/L)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
Norflurazon (µg/L)	0.24	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
Parathion Methyl (µg/L)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0.052	BDL	
simazine (µg/L)	0.042	BDL	BDL	BDL	0.018	BDL	BDL	BDL	BDL	BDL	

* average of duplicate values

BDL = below detection limit

Table 8. Pesticides at CUT1 and CUT 3: June 1, 2001 through September 21, 2001 Backpumping Events.

Parameters	CUT1					CUT3					FAC 62-302 Class I Criteria
	07/18/01	07/20/01*	07/24/01	07/27/01	08/02/01, 08/03/01	07/18/01	07/20/01	07/24/01	07/27/01	08/02/01, 08/03/01*	
ametryn (µg/L)	0.065	0.059	0.062	0.042	0.04	0.081	0.077	0.055	0.057	0.06	
atrazine (µg/L)	0.30	0.22	0.22	0.17	0.1	0.73	0.30	0.25	0.24	0.2	
atrazine desethyl (µg/L)	0.049	0.037	0.033	0.034	0.02	0.079	0.047	0.041	0.026	0.03	
atrazine desisopropyl (µg/L)	BDL	0.012	0.011	0.0091	BDL	0.023	0.016	0.015	0.012	BDL	
bromacil (µg/L)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
diazinon (µg/L)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
hexazinone (µg/L)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
malathion (µg/L)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	less than or equal to 0.1 mg/L
gamma-BHC (Lindane) (µg/L)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
metolachlor (µg/L)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
norflurazon (µg/L)	BDL	BDL	BDL	BDL	BDL	0.11	0.024	BDL	BDL	BDL	
parathion methyl (µg/L)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
simazine (µg/L)	BDL	BDL	BDL	BDL	BDL	0.025	BDL	BDL	BDL	0.03	

* average of duplicate values

BDL = below detection limit

Table 9. Pesticides at PH in, BG in, SB in: June 1, 2001 through September 21, 2001 Backpumping Events.

Station	PH in*		BG in		SB in		FAC 62-302
Date	08/17/01*	08/20/01	08/17/01	08/20/01	08/17/01	08/20/01	Class I Criteria
Parameter							
ametryn (µg/L)	BDL	BDL	BDL	BDL	BDL	BDL	
atrazine (µg/L)	0.15	0.015	0.088	0.022	0.089	0.030	
atrazine desethyl (µg/L)	0.039	0.17	0.018	0.03	0.017	0.06	
atrazine desisopropyl (µg/L)	0.019	0.042	BDL	BDL	BDL	0.014	
bromacil (µg/L)	0.092	0.015	BDL	BDL	BDL	BDL	
diazinon (µg/L)	BDL	BDL	BDL	BDL	BDL	BDL	
hexazinone (µg/L)	BDL	BDL	BDL	BDL	BDL	BDL	
malathion (µg/L)	BDL	BDL	BDL	BDL	BDL	BDL	less than or equal to 0.1 mg/L
gamma-BHC (Lindane) (µg/L)	BDL	BDL	BDL	BDL	BDL	BDL	
metolachlor (µg/L)	BDL	BDL	BDL	BDL	BDL	BDL	
norflurazon (µg/L)	0.059	BDL	BDL	BDL	BDL	0.022	
parathion methyl (µg/L)	BDL	BDL	BDL	BDL	BDL	BDL	
simazine (µg/L)	0.045	0.047	BDL	BDL	BDL	BDL	

* average of duplicate values

BDL = below detection limit

Table 10. List of Pesticide Compounds Monitored during the Backpumping Events in 2001.

** Chlorinated herbicides and organochlorine pesticides are not analyzed after 8/3/01 sampling event.
@ Prometon is added beginning 8/17/01 sampling event*

Chlorinated (Phenoxy Acid) Herbicides*
2,4-D*
2,4,5-T*
2,4,5-TP (silvex)*

Organonitrogen and phosphorus Pesticides
alachlor
ametryn
atrazine
atrazine desethyl
atrazine desisopropyl
azinphos methyl
bromacil
butylate
chlorpyrifos ethyl
chlorpyrifos methyl
demeton
diazinon
disulfoton
ethion
ethoprop
fenamiphos (nemacur)
fonofos (dyfonate)
hexazinone
malathion
metalaxyl
metolachlor
metribuzin
mevinphos
naled
norflurazon
parathion ethyl
parathion methyl
phorate
prometryn
simazine
prometon@

Organochlorine Pesticides*
aldrin*
alpha-BHC*
beta-BHC*
delta-BHC*
gamma-BHC (lindane)*
carbophenothion (trithion)*
chlordane*
chlorothalonil*
cypermethrin*
DDD-p,p'*
DDE-p,p'*
DDT-p,p'*
dicofol (kelthane)*
dieldrin*
endosulfan I (alpha)*
endosulfan II (beta)*
endosulfan sulfate*
endrin*
endrin aldehyde*
heptachlor*
heptachlor epoxide*
methoxychlor*
mirex*
permethrin*
toxaphene*
PCB-1016*
PCB-1221*
PCB-1232*
PCB-1242*
PCB-1248*
PCB-1254*
PCB-1260*
trifluralin*

Table 11. Ultra-Trace Mercury Data for June 1, 2001 through September 21, 2001 Backpumping Events.

station	date	THG, ng/l	TMHG, ng/l
S2	06/08/01	2.99	0.126
	06/12/01	4.776	0.237
	06/25/01	1.81	0.222
	06/28/01	ND	0.185
	07/10/01	1.3	0.488
	07/16/01	2.28	0.222
	07/20/01	2.31	0.173
	07/25/01	ND	0.239
	07/30/01	2.43	0.195
	08/02/01	ND	0.367
S3	06/05/01	1.16	0.12
	06/06/01	1.59	0.096
	06/07/01	1.357	0.094
	06/08/01	1.58	0.098
	06/10/01	2.07	0.113
	06/12/01	1.687	0.127
	06/22/01	1.71	0.332
	06/25/01	1.59	<0.014
	06/28/01	2.03	0.124
	07/12/01	ND	0.204
	07/16/01	2.43	0.446
	07/20/01	1.71	0.138
	07/25/01	ND	0.273
	07/30/01	2.98	0.221
S2DOWN	07/18/01	ND	0.15
	07/20/01	3.64	0.193
	07/24/01	ND	0.264
	08/02/01	3.29	0.3
S3DOWN	07/18/01	2.81	0.271
	07/20/01	1.84	0.177
	07/24/01	ND	0.29
CULV10A	07/05/01	6.26	0.23
	08/14/01	5.56	1.69
S308C	07/05/01	6.47	0.33
S352	08/05/01	4.75	0.798
S77	07/05/01	ND	0.147
CUT1	07/18/01	ND	0.134
	07/20/01	2.37	0.242
	07/24/01	1.75	0.193
	07/30/01	4.84	0.18
CUT3	07/18/01	2.24	0.259
	07/20/01	2.65	0.089
	07/24/01	4.82	0.266

Note: a "ND" value indicates that the value did not meet QA/QC criteria

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Table 12. Water Quality Data Summary at S2 for June 1, 2001 through September 21, 2001 .

Parameters	Period	Sample Type	n	min	max	avg	S.D.	FAC 62<302 Class I Criteria
Physical								
Temperature (°C)	06/01/01 - 09/19/01	grab	32	25.4	32.1	28.9	1.7	
Specific Conductivity (µmhos/cm)	06/01/01 - 09/19/01	grab	32	653	1185	991	127	Not greater than 50% above background or 1,275 µmhos/cm
Dissolved Oxygen (mg/L)	06/01/01 - 09/19/01	grab	32	1.6	12.5	3.4	2.2	Not less than 5.0 mg/L
Water pH (units)	06/01/01 - 09/19/01	grab	32	6.9	7.9	7.3	0.2	Not less than 6.0 or greater than 8.5 units
Turbidity (NTU)	06/01/01 - 09/19/01	grab	30	2.7	36.0	9.7	8.2	Less than or equal to 29 NTU above background
Color (PCU)	06/01/01 - 09/19/01	grab	30	26	176	126	29	
Total Suspended Solids (mg/L)	06/01/01 - 09/19/01	grab	28	2.8	83.0	15.9	19.3	
Total Dissolved Solids (mg/L)	06/01/01 - 09/19/01	grab	24	415.0	789.0	648.8	100.5	
Hardness (mg/L as CaCO ₃)	06/01/01 - 09/19/01	grab	16	190.6	464.6	388.6	61.6	
Alkalinity (mg/L as CaCO ₃)	06/01/01 - 09/19/01	grab	29	133.9	350.7	281.4	53.9	
Nutrients								
Total Nitrogen (mg/L)	06/01/01 - 09/19/01	grab	33	1.5	9.5	3.7	1.5	
	06/01/01 - 09/19/01	comp	34	2.5	5.4	3.6	0.8	
Total Kjeldahl Nitrogen (mg/L)	06/01/01 - 09/19/01	grab	33	1.4	7.9	2.9	1.1	
	06/01/01 - 09/19/01	comp	34	2.0	4.3	3.0	0.5	
Total Dissolved Kjeldahl Nitrogen (mg/L)	06/01/01 - 09/19/01	grab	23	1.2	3.1	2.4	0.5	
Nitrate+Nitrite as N (mg/L)	06/01/01 - 09/19/01	grab	33	0.023	1.870	0.798	0.585	
	06/01/01 - 09/19/01	comp	34	0.010	1.732	0.593	0.474	
Nitrite as N (mg/L)	06/01/01 - 09/19/01	grab	33	<0.004	0.156	0.059	0.039	
Nitrate as N(mg/L)	06/01/01 - 09/19/01	grab	32	0.036	1.789	0.761	0.542	Equal or less than 10 mg/L as N
Ammonium as N (mg/L)	06/01/01 - 09/19/01	grab	33	0.021	0.615	0.233	0.157	
Un-ionized Ammonia as NH ₃ (mg/L)	06/01/01 - 09/19/01	grab	32	0.001	0.009	0.004	0.002	Equal or less than 0.02 mg/L as NH ₃
Total Phosphorus (mg/L)	06/01/01 - 09/19/01	grab	33	0.033	1.136	0.124	0.185	
	06/01/01 - 09/19/01	comp	34	0.058	0.171	0.106	0.026	
Orthophosphate as P (mg/L)	06/01/01 - 09/19/01	grab	32	0.007	0.083	0.048	0.022	
Total Dissolved Phosphorus (mg/L)	06/01/01 - 09/19/01	grab	23	0.014	0.087	0.050	0.022	
Silica (mg/L)	06/01/01 - 09/19/01	grab	24	8.213	22.904	16.523	3.799	
Major Ions								
Chloride (mg/L)	06/01/01 - 09/19/01	grab	29	86.590	140.860	108.152	11.767	Equal or less than 250 mg/L
Sulfate (mg/L)	06/01/01 - 09/19/01	grab	24	16.880	125.150	66.541	29.573	
Sodium (mg/L)	06/01/01 - 08/03/01	grab	16	50.952	86.001	65.136	9.967	
Potassium (mg/L)	06/01/01 - 08/03/01	grab	16	6.620	9.862	8.036	0.793	
Calcium (mg/L)	06/01/01 - 08/03/01	grab	16	48.928	126.850	105.271	17.235	
Magnesium (mg/L)	06/01/01 - 08/03/01	grab	16	16.611	35.902	30.555	4.717	
Trace Metals								
Total Arsenic (µg/L)	06/01/01 - 08/02/01	grab	11	3.2	6.1	4.7	0.8	Less than or equal to 50 µg/L
Total Cadmium (µg/L)	06/01/01 - 08/02/01	grab	11	<0.3	0.3	<0.3	0.1	Less than or equal to calculated value
Total Copper (µg/L)	06/01/01 - 08/02/01	grab	11	2.1	3.5	2.9	0.4	Less than or equal to calculated value
Total Iron (µg/L)	06/01/01 - 08/02/01	grab	11	90.0	477.2	238.1	150.3	Less than or equal to 300 µg/L
Total Lead (µg/L)	06/01/01 - 08/02/01	grab	11	<0.8	<0.8	<0.8		Less than or equal to calculated value
Total Zinc (µg/L)	06/01/01 - 08/02/01	grab	11	<4	<4	<4		Less than or equal to calculated value
Phytoplankton Indicators								
Chlorophyll a (µg/L)	06/01/01 - 09/19/01	grab	22	3.1	159.2	21.4	34.1	
Chlorophyll a2 (µg/L)	06/01/01 - 09/19/01	grab	22	2.1	150.6	17.8	32.4	
Chlorophyll b (µg/L)	06/01/01 - 09/19/01	grab	23	<1	3.7	<1	0.8	
Chlorophyll c (µg/L)	06/01/01 - 09/19/01	grab	23	<1	10.1	1.9	2.3	
Pheophytin a (µg/L)	06/01/01 - 09/19/01	grab	22	<1	13.1	5.3	3.7	
Carotenoid (µg/L)	06/01/01 - 09/19/01	grab	22	2.0	56.0	9.5	12.0	
Total Organic Carbon (mg/L)	06/01/01 - 09/19/01	grab	23	17.2	47.2	37.1	7.2	

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Table 13. Water Quality Data Summary at S3 for June 1, 2001 through September 21, 2001 .

Parameters	Period	Sample Type	n	min	max	avg	S.D.	FAC 62<302 Class I Criteria
Physical								
Temperature (°C)	06/02/01 - 09/19/01	grab	34	26.0	31.7	29.2	1.6	
Specific Conductivity (µmhos/cm)	06/02/01 - 09/19/01	grab	34	570	1124	811	133	Not greater than 50% above background or 1,275 µmhos/cm
Dissolved Oxygen (mg/L)	06/02/01 - 09/19/01	grab	34	2.1	8.2	4.3	1.7	Not less than 5.0 mg/L
Water pH (units)	06/02/01 - 09/19/01	grab	34	7.0	8.2	7.4	0.3	Not less than 6.0 or greater than 8.5 units
Turbidity (NTU)	06/02/01 - 09/19/01	grab	33	2.3	17.6	6.4	4.1	Less than or equal to 29 NTU above background
Color (PCU)	06/02/01 - 09/19/01	grab	33	26	190	120	40	
Total Suspended Solids (mg/L)	06/02/01 - 09/19/01	grab	32	<3	26.0	8.3	5.5	
Total Dissolved Solids (mg/L)	06/05/01 - 09/19/01	grab	28	374.0	735.0	520.2	93.9	
Hardness (mg/L as CaCO3)	06/05/01 - 08/03/01	grab	20	199.1	370.7	315.8	53.4	
Alkalinity (mg/L as CaCO3)	06/05/01 - 09/19/01	grab	32	111.4	274.6	219.9	39.1	
Nutrients								
Total Nitrogen (mg/L)	06/02/01 - 09/19/01	grab	35	1.6	6.0	3.2	1.1	
	06/06/01 - 09/22/01	comp	34	2.3	5.8	3.4	0.8	
Total Kjeldahl Nitrogen (mg/L)	06/02/01 - 09/19/01	grab	35	1.5	3.1	2.4	0.5	
	06/06/01 - 09/22/01	comp	34	2.0	5.8	2.7	0.7	
Total Dissolved Kjeldahl Nitrogen (mg/L)	06/05/01 - 09/19/01	grab	27	1.2	2.9	2.1	0.5	
Nitrate+Nitrite as N (mg/L)	06/02/01 - 09/19/01	grab	34	0.049	2.926	0.894	0.799	
	06/06/01 - 09/22/01	comp	34	<0.004	2.081	0.759	0.653	
Nitrite as N (mg/L)	06/02/01 - 09/19/01	grab	34	0.007	0.132	0.049	0.035	
Nitrate as N(mg/L)	06/02/01 - 09/19/01	grab	34	0.036	2.815	0.846	0.769	Equal or less than 10 mg/L as N
Ammonium as N (mg/L)	06/02/01 - 09/19/01	grab	33	0.014	0.468	0.135	0.124	
Un-ionized Ammonia as NH3 (mg/L)	06/02/01 - 09/19/01	grab	33	0.000	0.008	0.003	0.002	Equal or less than 0.02 mg/L as NH ₃
Total Phosphorus (mg/L)	06/02/01 - 09/19/01	grab	35	0.035	0.129	0.072	0.026	
	06/06/01 - 09/22/01	comp	34	0.032	0.506	0.086	0.080	
Orthophosphate as P (mg/L)	06/02/01 - 09/19/01	grab	34	0.004	0.091	0.030	0.027	
Total Dissolved Phosphorus (mg/L)	06/05/01 - 09/19/01	grab	27	0.011	0.099	0.040	0.029	
Silica (mg/L)	06/05/01 - 09/19/01	grab	28	6.289	17.771	9.874	2.698	
Major Ions								
Chloride (mg/L)	06/05/01 - 09/19/01	grab	32	59.690	129.640	87.847	17.877	Equal or less than 250 mg/L
Sulfate (mg/L)	06/05/01 - 09/19/01	grab	28	14.760	107.500	53.385	24.332	
Sodium (mg/L)	06/05/01 - 08/03/01	grab	20	48.583	88.322	57.556	9.301	
Potassium (mg/L)	06/05/01 - 08/03/01	grab	20	5.170	8.774	7.141	0.765	
Calcium (mg/L)	06/05/01 - 08/03/01	grab	20	50.823	113.767	94.421	18.510	
Magnesium (mg/L)	06/05/01 - 08/03/01	grab	20	11.442	27.866	19.571	3.552	
Trace Metals								
Total Arsenic (µg/L)	06/05/01 - 08/03/01	grab	15	2.8	5.5	4.0	0.8	Less than or equal to 50 µg/L
Total Cadmium (µg/L)	06/05/01 - 08/03/01	grab	15	<0.3	0.3	<0.3	0.0	Less than or equal to calculated value
Total Copper (µg/L)	06/05/01 - 08/03/01	grab	15	1.3	3.0	2.3	0.5	Less than or equal to calculated value
Total Iron (µg/L)	06/05/01 - 08/03/01	grab	14	69.1	285.3	128.7	67.6	Less than or equal to 300 µg/L
Total Lead (µg/L)	06/05/01 - 08/03/01	grab	15	<0.8	<0.8	<0.8		Less than or equal to calculated value
Total Zinc (µg/L)	06/05/01 - 08/03/01	grab	15	<4	<4	<4		Less than or equal to calculated value
Phytoplankton Indicators								
Chlorophyll a (µg/L)	06/05/01 - 09/19/01	grab	26	4.8	46.9	16.6	11.5	
Chlorophyll a2 (µg/L)	06/05/01 - 09/19/01	grab	26	3.3	39.1	12.9	9.8	
Chlorophyll b (µg/L)	06/05/01 - 09/19/01	grab	26	<1	8.6	1.1	1.6	
Chlorophyll c (µg/L)	06/05/01 - 09/19/01	grab	27	<1	4.3	1.6	1.1	
Pheophytin a (µg/L)	06/05/01 - 09/19/01	grab	26	<1	12.5	5.2	3.3	
Carotenoid (µg/L)	06/05/01 - 09/19/01	grab	27	2.2	22.9	8.1	5.4	
Total Organic Carbon (mg/L)	06/05/01 - 09/19/01	grab	28	18.4	46.9	32.6	6.8	

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Table 14. Water Quality Data Summary at S4 for June 1, 2001 through September 21, 2001 .

Parameters	Period	Sample Type	n	min	max	avg	S.D.	FAC 62<302 Class I Criteria
Physical								
Temperature (°C)	06/18/01 - 09/24/01	grab	14	5.0	31.9	27.8	6.9	
Specific Conductivity (µmhos/cm)	06/18/01 - 09/24/01	grab	14	421	1136	742	230	Not greater than 50% above background or 1,275 µmhos/cm
Dissolved Oxygen (mg/L)	06/18/01 - 09/24/01	grab	14	1.0	12.6	4.7	3.8	Not less than 5.0 mg/L
Water pH (units)	06/18/01 - 09/24/01	grab	14	6.6	8.3	7.3	0.5	Not less than 6.0 or greater than 8.5 units
Turbidity (NTU)	06/18/01 - 09/24/01	grab	6	1.9	14.9	6.5	4.8	Less than or equal to 29 NTU above background
Color (PCU)	06/18/01 - 09/24/01	grab	6	80	222	149	56	
Total Suspended Solids (mg/L)	06/18/01 - 09/24/01	grab	6	1.2	38.0	13.3	13.6	
Total Dissolved Solids (mg/L)	07/16/01 - 07/16/01	grab	1			408.0		
Hardness (mg/L as CaCO3)	07/16/01 - 07/16/01	grab	1			275.5		
Alkalinity (mg/L as CaCO3)	06/18/01 - 09/24/01	grab	6	156.1	238.1	196.7	29.4	
Nutrients								
Total Nitrogen (mg/L)	06/18/01 - 09/24/01	grab	14	2.3	4.3	3.0	0.6	
	08/04/01 - 09/19/01	comp	8	2.0	3.3	2.7	0.4	
Total Kjeldahl Nitrogen (mg/L)	06/18/01 - 09/24/01	grab	14	1.8	4.2	2.6	0.6	
	08/04/01 - 09/19/01	comp	8	2.0	3.0	2.5	0.3	
Total Dissolved Kjeldahl Nitrogen (mg/L)								
Nitrate+Nitrite as N (mg/L)	06/18/01 - 09/24/01	grab	14	0.044	1.082	0.326	0.288	
	08/04/01 - 09/19/01	comp	8	<0.004	0.431	0.182	0.144	
Nitrite as N (mg/L)	06/18/01 - 09/24/01	grab	7	0.017	0.161	0.076	0.051	
Nitrate as N(mg/L)	06/18/01 - 09/24/01	grab	7	0.008	0.972	0.306	0.340	Equal or less than 10 mg/L as N
Ammonium as N (mg/L)	06/18/01 - 09/24/01	grab	14	0.015	0.822	0.383	0.266	
Un-ionized Ammonia as NH3 (mg/L)	06/18/01 - 09/24/01	grab	14	0.000	0.012	0.006	0.003	Equal or less than 0.02 mg/L as NH ₃
Total Phosphorus (mg/L)	06/18/01 - 09/24/01	grab	14	0.110	0.388	0.213	0.083	
	08/04/01 - 09/19/01	comp	8	0.076	0.185	0.149	0.037	
Orthophosphate as P (mg/L)	06/18/01 - 09/24/01	grab	7	0.006	0.151	0.074	0.064	
Total Dissolved Phosphorus (mg/L)								
Silica (mg/L)	07/16/01 - 07/16/01	grab	1			13.241		
Major Ions								
Chloride (mg/L)	06/18/01 - 09/24/01	grab	6	48.330	131.120	94.753	26.765	Equal or less than 250 mg/L
Sulfate (mg/L)	07/16/01 - 07/16/01	grab	1			62.190		
Sodium (mg/L)	07/16/01 - 07/16/01	grab	1			55.615		
Potassium (mg/L)	07/16/01 - 07/16/01	grab	1			7.869		
Calcium (mg/L)	07/16/01 - 07/16/01	grab	1			85.045		
Magnesium (mg/L)	07/16/01 - 07/16/01	grab	1			15.342		

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Table 15. Water Quality Data Summary at S77 for June 1, 2001 through September 21, 2001 .

Parameters	Period	Sample Type	n	min	max	avg	S.D.	FAC 62-302 Class I Criteria
Physical								
Temperature (°C)	06/18/01 - 0/24/01	grab	11	27.9	36.3	30.3	2.4	
Specific Conductivity (µmhos/cm)	06/18/01 - 0/24/01	grab	11	247	694	578	166	Not greater than 50% above background or 1,275 µmhos/cm
Dissolved Oxygen (mg/L)	06/18/01 - 0/24/01	grab	10	1.0	11.8	5.3	3.2	Not less than 5.0 mg/L
Water pH (units)	06/18/01 - 0/24/01	grab	11	6.6	8.5	7.5	0.5	Not less than 6.0 or greater than 8.5 units
Turbidity (NTU)	06/18/01 - 0/24/01	grab	11	1.6	9.1	3.7	2.4	Less than or equal to 29 NTU above background
Color (PCU)	06/18/01 - 0/24/01	grab	11	73	532	167	138	
Total Suspended Solids (mg/L)	06/18/01 - 0/24/01	grab	11	2.0	19.2	7.4	5.7	
Total Dissolved Solids (mg/L)	06/18/01 - 0/24/01	grab	1			383.0		
Hardness (mg/L as CaCO3)	06/18/01 - 0/24/01	grab	2	238.2	242.7	240.4		
Alkalinity (mg/L as CaCO3)	06/18/01 - 0/24/01	grab	11	42.8	204.6	165.1	57.3	
Nutrients								
Total Nitrogen (mg/L)	06/18/01 - 09/24/01	grab	15	1.7	2.9	2.0	0.4	
Total Kjeldahl Nitrogen (mg/L)	06/18/01 - 09/24/01	grab	15	1.5	2.6	1.9	0.3	
Nitrate+Nitrite as N (mg/L)	06/18/01 - 09/24/01	grab	15	<0.004	0.577	0.115	0.162	
Nitrite as N (mg/L)	06/18/01 - 09/24/01	grab	11	<0.004	0.089	0.018	0.025	
Nitrate as N(mg/L)	06/18/01 - 09/24/01	grab	8	<0.004	0.488	0.110	0.163	Equal or less than 10 mg/L as N
Ammonium as N (mg/L)	06/18/01 - 09/24/01	grab	15	<0.009	1.013	0.169	0.253	
Un-ionized Ammonia as NH ₃ (mg/L)	06/18/01 - 09/24/01	grab	11	0.000	0.006	0.002	0.002	Equal or less than 0.02 mg/L as NH ₃
Total Phosphorus (mg/L)	06/18/01 - 09/24/01	grab	15	0.105	0.268	0.185	0.054	
Orthophosphate as P (mg/L)	06/18/01 - 09/24/01	grab	11	0.011	0.207	0.096	0.070	
Silica (mg/L)	06/18/01 - 09/24/01	grab	1			11.582		
Major Ions								
Chloride (mg/L)	06/18/01 - 09/24/01	grab	11	28.730	75.350	58.413	14.317	Equal or less than 250 mg/L
Sulfate (mg/L)	07/16/01 - 07/16/01	grab	1			32.170		
Sodium (mg/L)	07/16/01 - 07/16/01	grab	2	34.598	35.641	35.119		
Potassium (mg/L)	07/16/01 - 07/16/01	grab	2	6.655	6.976	6.816		
Calcium (mg/L)	07/16/01 - 07/16/01	grab	2	79.198	80.018	79.608		
Magnesium (mg/L)	07/16/01 - 07/16/01	grab	2	9.811	10.414	10.112		
Trace Metals								
Total Arsenic (µg/L)	07/05/01 - 07/05/01	grab	1			2.2		Less than or equal to 50 µg/L
Total Cadmium (µg/L)	07/05/01 - 07/05/01	grab	1			<0.3		Less than or equal to calculated value
Total Copper (µg/L)	07/05/01 - 07/05/01	grab	1			1.5		Less than or equal to calculated value
Total Iron (µg/L)	07/05/01 - 07/05/01	grab	1			70.4		Less than or equal to 300 µg/L
Total Lead (µg/L)	07/05/01 - 07/05/01	grab	1			<0.8		Less than or equal to calculated value
Total Zinc (µg/L)	07/05/01 - 07/05/01	grab	1			<4		Less than or equal to calculated value

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Table 16. Water Quality Data Summary at S308 for June 1, 2001 through September 21, 2001 .

Parameters	Period	Sample Type	n	min	max	avg	S.D.	FAC 62-302 Class I Criteria
Physical								
Temperature (°C)	06/18/01 - 09/24/01	grab	11	26.8	30.8	29.0	1.2	
Specific Conductivity (µmhos/cm)	06/18/01 - 09/24/01	grab	11	516	849	686	114	Not greater than 50% above background or 1,275 µmhos/cm
Dissolved Oxygen (mg/L)	06/18/01 - 09/24/01	grab	11	0.3	4.8	3.5	1.2	Not less than 5.0 mg/L
Water pH (units)	06/18/01 - 09/24/01	grab	11	6.9	7.6	7.2	0.2	Not less than 6.0 or greater than 8.5 units
Turbidity (NTU)	06/18/01 - 09/24/01	grab	11	2.5	19.0	8.8	5.9	Less than or equal to 29 NTU above background
Color (PCU)	06/18/01 - 09/24/01	grab	11	40	218	111	51	
Total Suspended Solids (mg/L)	06/18/01 - 09/24/01	grab	11	1.2	23.6	10.7	8.2	
Total Dissolved Solids (mg/L)	07/16/01 - 08/28/01	grab	2	418.0	478.0	448.0		
Hardness (mg/L as CaCO ₃)	07/05/01 - 07/16/01	grab	2	250.0	265.2	257.6		
Alkalinity (mg/L as CaCO ₃)	06/18/01 - 09/24/01	grab	11	114.5	190.9	156.3	27.7	
Nutrients								
Total Nitrogen (mg/L)	06/18/01 - 09/24/01	grab	15	1.4	4.3	1.9	0.7	
Total Kjeldahl Nitrogen (mg/L)	06/18/01 - 09/24/01	grab	15	1.3	4.1	1.7	0.7	
Total Dissolved Kjeldahl Nitrogen (mg/L)	08/28/01 - 08/28/01	grab	1			1.2		
Nitrate+Nitrite as N (mg/L)	06/18/01 - 09/24/01	grab	15	0.074	0.405	0.215	0.086	
Nitrite as N (mg/L)	06/18/01 - 09/24/01	grab	11	0.008	0.052	0.031	0.014	
Nitrate as N(mg/L)	06/18/01 - 09/24/01	grab	11	0.059	0.353	0.180	0.082	Equal or less than 10 mg/L as N
Ammonium as N (mg/L)	06/18/01 - 09/24/01	grab	15	0.170	0.321	0.235	0.048	
Un-ionized Ammonia as NH ₃ (mg/L)	06/18/01 - 09/24/01	grab	11	0.001	0.007	0.003	0.002	Equal or less than 0.02 mg/L as NH ₃
Total Phosphorus (mg/L)	06/18/01 - 09/24/01	grab	15	0.196	0.740	0.325	0.136	
Orthophosphate as P (mg/L)	06/18/01 - 09/24/01	grab	11	0.119	0.406	0.219	0.078	
Total Dissolved Phosphorus (mg/L)	08/28/01 - 08/28/01	grab	1			0.259		
Silica (mg/L)	07/16/01 - 08/28/01	grab	2	10.654	11.515	11.085		
Major Ions								
Chloride (mg/L)	06/18/01 - 09/24/01	grab	11	60.430	104.860	82.132	14.488	Equal or less than 250 mg/L
Sulfate (mg/L)	07/16/01 - 08/28/01	grab	2	47.230	59.200	53.215		
Sodium (mg/L)	07/05/01 - 07/16/01	grab	2	50.912	61.473	56.192		
Potassium (mg/L)	07/05/01 - 07/16/01	grab	2	6.981	9.310	8.146		
Calcium (mg/L)	07/05/01 - 07/16/01	grab	2	81.290	86.101	83.695		
Magnesium (mg/L)	07/05/01 - 07/16/01	grab	2	11.424	12.192	11.808		
Trace Metals								
Total Arsenic (µg/L)	07/05/01 - 07/05/01	grab	1			1.9		Less than or equal to 50 µg/L
Total Cadmium (µg/L)	07/05/01 - 07/05/01	grab	1			<0.3		Less than or equal to calculated value
Total Copper (µg/L)	07/05/01 - 07/05/01	grab	1			4.6		Less than or equal to calculated value
Total Iron (µg/L)	07/05/01 - 07/05/01	grab	1			694.8		Less than or equal to 300 µg/L
Total Lead (µg/L)	07/05/01 - 07/05/01	grab	1			<0.8		Less than or equal to calculated value
Total Zinc (µg/L)	07/05/01 - 07/05/01	grab	1			<4		Less than or equal to calculated value
Phytoplankton Indicators								
Chlorophyll a (µg/L)	08/28/01 - 08/28/01	grab	1			7.2		
Chlorophyll a2 (µg/L)	08/28/01 - 08/28/01	grab	1			5.8		
Chlorophyll b (µg/L)	08/28/01 - 08/28/01	grab	1			<1		
Chlorophyll c (µg/L)	08/28/01 - 08/28/01	grab	1			<1		
Pheophytin a (µg/L)	08/28/01 - 08/28/01	grab	1			2.2		
Carotenoid (µg/L)	08/28/01 - 08/28/01	grab	1			3.4		
Total Organic Carbon (mg/L)	08/28/01 - 08/28/01	grab	1			21.1		
Dissolved Organic Carbon (mg/L)	08/28/01 - 08/28/01	grab	1			21.6		

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Table 17. Water Quality Data Summary at C-10A at L8 for June 1, 2001 through September 21, 2001 .

Parameters	Period	Sample Type	n	min	max	avg	S.D.	FAC 62-302 Class I Criteria
Physical								
Temperature (°C)	06/18/01 - 09/24/01	grab	10	27.7	30.6	29.3	1.0	
Specific Conductivity (µmhos/cm)	06/18/01 - 09/24/01	grab	10	510	968	680	142	Not greater than 50% above background or 1,275 µmhos/cm
Dissolved Oxygen (mg/L)	06/18/01 - 09/24/01	grab	10	1.5	4.5	2.7	1.0	Not less than 5.0 mg/L
Water pH (units)	06/18/01 - 09/24/01	grab	10	7.0	7.6	7.2	0.2	Not less than 6.0 or greater than 8.5 units
Turbidity (NTU)	06/18/01 - 09/24/01	grab	10	3.3	46.2	14.1	13.6	Less than or equal to 29 NTU above background
Color (PCU)	06/18/01 - 09/24/01	grab	10	38	255	127	80	
Total Suspended Solids (mg/L)	06/18/01 - 09/24/01	grab	10	4.6	97.0	27.5	29.0	
Total Dissolved Solids (mg/L)	07/16/01 - 07/16/01	grab	1			519.0		
Hardness (mg/L as CaCO ₃)	07/05/01 - 07/16/01	grab	2	199.5	275.3	237.4		
Alkalinity (mg/L as CaCO ₃)	06/18/01 - 09/24/01	grab	10	143.1	205.2	172.6	22.4	
Nutrients								
Total Nitrogen (mg/L)	06/18/01 - 09/24/01	grab	14	1.0	3.6	2.0	0.7	
Total Kjeldahl Nitrogen (mg/L)	06/18/01 - 09/24/01	grab	14	0.9	2.7	1.9	0.6	
Nitrate+Nitrite as N (mg/L)	06/18/01 - 09/24/01	grab	14	0.010	0.881	0.151	0.227	
Nitrite as N (mg/L)	06/18/01 - 09/24/01	grab	10	<0.004	0.043	0.014	0.012	
Nitrate as N(mg/L)	07/02/01 - 09/24/01	grab	9	0.045	0.325	0.105	0.085	Equal or less than 10 mg/L as N
Ammonium as N (mg/L)	06/18/01 - 09/24/01	grab	14	0.041	0.415	0.144	0.100	
Un-ionized Ammonia as NH ₃ (mg/L)	06/18/01 - 09/24/01	grab	10	0.001	0.003	0.002	0.001	Equal or less than 0.02 mg/L as NH ₃
Total Phosphorus (mg/L)	06/18/01 - 09/24/01	grab	14	0.042	0.170	0.098	0.038	
Orthophosphate as P (mg/L)	06/18/01 - 09/24/01	grab	10	0.012	0.052	0.032	0.013	
Silica (mg/L)	07/16/01 - 07/16/01	grab	1			14.764		
Major Ions								
Chloride (mg/L)	06/18/01 - 09/24/01	grab	10	51.520	143.320	84.813	28.484	Equal or less than 250 mg/L
Sulfate (mg/L)	07/16/01 - 07/16/01	grab	1			43.360		
Sodium (mg/L)	07/05/01 - 07/16/01	grab	2	37.075	77.381	57.228		
Potassium (mg/L)	07/05/01 - 07/16/01	grab	2	1.729	4.687	3.208		
Calcium (mg/L)	07/05/01 - 07/16/01	grab	2	71.716	90.385	81.051		
Magnesium (mg/L)	07/05/01 - 07/16/01	grab	2	4.951	12.047	8.499		
Trace Metals								
Total Arsenic (µg/L)	07/05/01 - 07/05/01	grab	1			1.6		Less than or equal to 50 µg/L
Total Cadmium (µg/L)	07/05/01 - 07/05/01	grab	1			<0.3		Less than or equal to calculated value
Total Copper (µg/L)	07/05/01 - 07/05/01	grab	1			<1.2		Less than or equal to calculated value
Total Iron (µg/L)	07/05/01 - 07/05/01	grab	1			650.7		Less than or equal to 300 µg/L
Total Lead (µg/L)	07/05/01 - 07/05/01	grab	1			<0.8		Less than or equal to calculated value
Total Zinc (µg/L)	07/05/01 - 07/05/01	grab	1			<4		Less than or equal to calculated value

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Table 18. Water Quality Data Summary at S-352 for June 1, 2001 through September 21, 2001 .

Parameters	Period	Sample Type	n	min	max	avg	S.D.	FAC 62-302 Class I Criteria
Physical								
Temperature (°C)	06/05/01 - 09/24/01	grab	15	25.4	32.2	29.2	1.6	
Specific Conductivity (µmhos/cm)	06/05/01 - 09/24/01	grab	15	631	1851	946	436	Not greater than 50% above background or 1,275 µmhos/cm
Dissolved Oxygen (mg/L)	06/05/01 - 09/24/01	grab	14	0.5	12.9	4.9	3.0	Not less than 5.0 mg/L
Water pH (units)	06/05/01 - 09/24/01	grab	15	6.8	8.3	7.7	0.4	Not less than 6.0 or greater than 8.5 units
Turbidity (NTU)	06/05/01 - 09/24/01	grab	11	6.8	42.6	21.4	15.5	Less than or equal to 29 NTU above background
Color (PCU)	06/05/01 - 09/24/01	grab	11	23	145	63	44	
Total Suspended Solids (mg/L)	06/05/01 - 09/24/01	grab	11	7.2	53.0	26.8	16.7	
Total Dissolved Solids (mg/L)	06/05/01 - 07/31/01	grab	5	386.0	552.0	426.8	70.8	
Hardness (mg/L as CaCO ₃)	06/05/01 - 07/31/01	grab	5	186.9	244.9	203.9	23.7	
Alkalinity (mg/L as CaCO ₃)	06/05/01 - 09/24/01	grab	11	125.0	318.9	178.2	64.5	
Nutrients								
Total Nitrogen (mg/L)	06/05/01 - 09/24/01	grab	20	1.4	7.5	3.0	1.8	
Total Kjeldahl Nitrogen (mg/L)	06/05/01 - 09/24/01	grab	20	1.3	5.9	2.7	1.4	
Nitrate+Nitrite as N (mg/L)	06/05/01 - 09/24/01	grab	20	0.007	1.598	0.332	0.496	
Nitrite as N (mg/L)	06/05/01 - 09/24/01	grab	12	<0.004	0.303	0.055	0.093	
Nitrate as N(mg/L)	06/05/01 - 09/24/01	grab	8	0.006	1.295	0.371	0.463	Equal or less than 10 mg/L as N
Ammonium as N (mg/L)	06/05/01 - 09/24/01	grab	20	<0.009	2.000	0.371	0.642	
Un-ionized Ammonia as NH ₃ (mg/L)	06/05/01 - 09/24/01	grab	16	0.001	0.042	0.007	0.011	Equal or less than 0.02 mg/L as NH ₃
Total Phosphorus (mg/L)	06/05/01 - 09/24/01	grab	20	0.104	0.421	0.184	0.071	
Orthophosphate as P (mg/L)	06/05/01 - 09/24/01	grab	12	0.008	0.163	0.060	0.044	
Silica (mg/L)	06/05/01 - 09/24/01	grab	5	8.387	16.529	10.486	3.402	
Major Ions								
Chloride (mg/L)	06/05/01 - 09/24/01	grab	11	80.740	271.280	120.051	58.907	Equal or less than 250 mg/L
Sulfate (mg/L)	06/05/01 - 07/31/01	grab	5	47.350	79.170	57.298	12.679	
Sodium (mg/L)	06/05/01 - 07/31/01	grab	5	49.557	92.043	59.560	18.255	
Potassium (mg/L)	06/05/01 - 07/31/01	grab	5	6.442	8.233	7.048	0.699	
Calcium (mg/L)	06/05/01 - 07/31/01	grab	5	48.354	60.439	53.349	4.412	
Magnesium (mg/L)	06/05/01 - 07/31/01	grab	5	13.936	22.817	17.172	3.391	
Phytoplankton Indicators								
Chlorophyll a (µg/L)	06/05/01 - 06/19/01	grab	2	21.0	26.3	23.7		
Chlorophyll a2 (µg/L)	06/05/01 - 06/19/01	grab	2	16.0	22.3	19.2		
Chlorophyll b (µg/L)	06/05/01 - 06/19/01	grab	2	<1	1.1	<1		
Chlorophyll c (µg/L)	06/05/01 - 06/19/01	grab	2	<1	<1	<1		
Pheophytin a (µg/L)	06/05/01 - 06/19/01	grab	2	5.0	7.8	6.4		
Carotenoid (µg/L)	06/05/01 - 06/19/01	grab	2	11.4	12.0	11.7		
Total Organic Carbon (mg/L)	06/05/01 - 07/31/01	grab	3	15.7	18.0	16.7	1.2	
Dissolved Organic Carbon (mg/L)	06/05/01 - 07/31/01	grab	4	15.5	17.2	16.4	0.7	

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Table 19. Water Quality Data Summary at S2DOWN for June 1, 2001 through September 21, 2001 .

Parameters	Period	Sample Type	n	min	max	avg	S.D.	FAC 62-302 Class I Criteria
Physical								
Temperature (°C)	06/04/01 - 08/30/01	grab	11	25.5	31.0	28.3	1.7	
Specific Conductivity (µmhos/cm)	06/04/01 - 08/30/01	grab	11	786	1161	986	107	Not greater than 50% above background or 1,275 µmhos/cm
Dissolved Oxygen (mg/L)	06/04/01 - 08/30/01	grab	11	1.4	4.7	2.9	1.1	Not less than 5.0 mg/L
Water pH (units)	06/04/01 - 08/30/01	grab	11	7.0	7.5	7.1	0.2	Not less than 6.0 or greater than 8.5 units
Turbidity (NTU)	06/04/01 - 08/30/01	grab	11	3.2	17.3	10.1	3.8	Less than or equal to 29 NTU above background
Secchi Disk Depth, meters	06/10/01 - 08/30/01	grab	10	0.4	0.8	0.6	0.1	
Color (PCU)	06/04/01 - 08/30/01	grab	11	96	163	119	22	
Total Suspended Solids (mg/L)	06/04/01 - 08/30/01	grab	11	4.0	19.2	12.3	4.9	
Total Dissolved Solids (mg/L)	06/04/01 - 08/30/01	grab	11	491.0	759.0	628.7	78.0	
Hardness (mg/L as CaCO ₃)	06/04/01 - 08/30/01	grab	13	297.6	432.1	366.2	37.2	
Alkalinity (mg/L as CaCO ₃)	06/04/01 - 08/30/01	grab	11	207.4	330.5	275.1	40.6	
Nutrients								
Total Nitrogen (mg/L)	06/04/01 - 08/30/01	grab	11	2.0	5.0	3.5	1.0	
Total Kjeldahl Nitrogen (mg/L)	06/04/01 - 08/30/01	grab	11	2.0	3.5	2.7	0.4	
Total Dissolved Kjeldahl Nitrogen (mg/L)	06/04/01 - 08/30/01	grab	11	1.8	3.2	2.3	0.4	
Nitrate+Nitrite as N (mg/L)	06/04/01 - 08/30/01	grab	11	0.054	1.650	0.876	0.598	
Nitrite as N (mg/L)	06/04/01 - 08/30/01	grab	11	0.008	0.095	0.060	0.033	
Nitrate as N(mg/L)	06/04/01 - 08/30/01	grab	11	0.046	1.563	0.816	0.567	Equal or less than 10 mg/L as N
Ammonium as N (mg/L)	06/04/01 - 08/30/01	grab	11	0.024	0.620	0.255	0.187	
Un-ionized Ammonia as NH ₃ (mg/L)	06/04/01 - 08/30/01	grab	11	0.001	0.005	0.003	0.001	Equal or less than 0.02 mg/L as NH ₃
Total Phosphorus (mg/L)	06/04/01 - 08/30/01	grab	11	0.039	0.120	0.090	0.027	
Orthophosphate as P (mg/L)	06/04/01 - 08/30/01	grab	11	0.006	0.065	0.042	0.021	
Total Dissolved Phosphorus (mg/L)	06/04/01 - 08/30/01	grab	11	0.012	0.074	0.047	0.022	
Silica (mg/L)	06/04/01 - 08/30/01	grab	11	9.509	21.283	14.805	3.866	
Major Ions								
Chloride (mg/L)	06/04/01 - 08/30/01	grab	11	92.740	127.460	103.497	9.546	Equal or less than 250 mg/L
Sulfate (mg/L)	06/04/01 - 08/30/01	grab	11	20.700	105.410	65.976	24.214	
Sodium (mg/L)	06/04/01 - 08/30/01	grab	13	51.280	85.757	64.597	9.610	
Potassium (mg/L)	06/04/01 - 08/30/01	grab	13	6.778	9.196	7.785	0.793	
Calcium (mg/L)	06/04/01 - 08/30/01	grab	13	79.252	115.018	101.100	9.421	
Magnesium (mg/L)	06/04/01 - 08/30/01	grab	13	20.648	35.175	28.281	3.912	
Trace Metals								
Total Arsenic (µg/L)	07/18/01 - 08/02/01	grab	5	4.4	5.4	4.9	0.4	Less than or equal to 50 µg/L
Total Cadmium (µg/L)	07/18/01 - 08/02/01	grab	5	<0.3	<0.3	<0.3		Less than or equal to calculated value
Total Copper (µg/L)	07/18/01 - 08/02/01	grab	5	2.0	3.1	2.7	0.4	Less than or equal to calculated value
Total Iron (µg/L)	07/18/01 - 08/02/01	grab	5	149.5	322.1	225.5	81.3	Less than or equal to 300 µg/L
Total Lead (µg/L)	07/18/01 - 08/02/01	grab	5	<0.8	<0.8	<0.8		Less than or equal to calculated value
Total Zinc (µg/L)	07/18/01 - 08/02/01	grab	5	<4	<4	<4		Less than or equal to calculated value
Phytoplankton Indicators								
Chlorophyll a (µg/L)	06/04/01 - 08/30/01	grab	11	4.8	139.2	31.1	37.9	
Chlorophyll a2 (µg/L)	06/04/01 - 08/30/01	grab	10	3.5	125.4	25.0	36.7	
Chlorophyll b (µg/L)	06/04/01 - 08/30/01	grab	11	<1	3.7	1.1	1.0	
Chlorophyll c (µg/L)	06/04/01 - 08/30/01	grab	11	<1	10.2	2.7	3.0	
Pheophytin a (µg/L)	06/04/01 - 08/30/01	grab	11	2.0	14.3	8.0	4.0	
Carotenoid (µg/L)	06/04/01 - 08/30/01	grab	11	2.3	44.0	12.1	11.4	
Total Organic Carbon (mg/L)	06/04/01 - 08/30/01	grab	11	29.5	40.7	34.9	4.2	
Dissolved Organic Carbon (mg/L)	06/04/01 - 08/30/01	grab	11	30.1	42.6	35.3	4.9	

Table 20. Water Quality Data Summary at S3DOWN for June 1, 2001 through September 21, 2001 .

Parameters	Period	Sample Type	n	min	max	avg	S.D.	FAC 62-302 Class I Criteria
Physical								
Temperature (°C)	06/04/01 - 08/30/01	grab	11	26.1	33.2	29.3	2.0	
Specific Conductivity (µmhos/cm)	06/04/01 - 08/30/01	grab	11	668	981	867	103	Not greater than 50% above background or 1,275 µmhos/cm
Dissolved Oxygen (mg/L)	06/04/01 - 08/30/01	grab	11	2.4	8.8	4.2	1.8	Not less than 5.0 mg/L
Water pH (units)	06/04/01 - 08/30/01	grab	11	7.0	8.0	7.3	0.3	Not less than 6.0 or greater than 8.5 units
Turbidity (NTU)	06/04/01 - 08/30/01	grab	11	5.3	10.7	7.1	1.6	Less than or equal to 29 NTU above background
Secchi Disk Depth, meters	06/10/01 - 08/30/01	grab	10	0.6	0.9	0.7	0.1	
Color (PCU)	06/04/01 - 08/30/01	grab	11	31	148	115	34	
Total Suspended Solids (mg/L)	06/04/01 - 08/30/01	grab	10	4.8	14.8	9.2	2.9	
Total Dissolved Solids (mg/L)	06/04/01 - 08/30/01	grab	11	408.0	663.0	560.4	75.8	
Hardness (mg/L as CaCO ₃)	06/04/01 - 08/30/01	grab	12	186.3	374.8	320.7	52.8	
Alkalinity (mg/L as CaCO ₃)	06/04/01 - 08/30/01	grab	11	124.5	274.2	231.7	42.5	
Nutrients								
Total Nitrogen (mg/L)	06/04/01 - 08/30/01	grab	11	1.8	5.1	3.3	1.0	
Total Kjeldahl Nitrogen (mg/L)	06/04/01 - 08/30/01	grab	11	1.7	3.3	2.5	0.4	
Total Dissolved Kjeldahl Nitrogen (mg/L)	06/04/01 - 08/30/01	grab	11	1.3	2.8	2.1	0.4	
Nitrate+Nitrite as N (mg/L)	06/04/01 - 08/30/01	grab	11	0.091	1.918	0.751	0.700	
Nitrite as N (mg/L)	06/04/01 - 08/30/01	grab	11	0.018	0.085	0.043	0.023	
Nitrate as N(mg/L)	06/04/01 - 08/30/01	grab	11	0.052	1.833	0.708	0.680	Equal or less than 10 mg/L as N
Ammonium as N (mg/L)	06/04/01 - 08/30/01	grab	11	0.031	0.318	0.132	0.097	
Un-ionized Ammonia as NH ₃ (mg/L)	06/04/01 - 08/30/01	grab	11	0.000	0.004	0.002	0.001	Equal or less than 0.02 mg/L as NH ₃
Total Phosphorus (mg/L)	06/04/01 - 08/30/01	grab	11	0.042	0.121	0.066	0.022	
Orthophosphate as P (mg/L)	06/04/01 - 08/30/01	grab	10	0.006	0.043	0.021	0.015	
Total Dissolved Phosphorus (mg/L)	06/04/01 - 08/30/01	grab	11	0.012	0.050	0.026	0.015	
Silica (mg/L)	06/04/01 - 08/30/01	grab	11	6.773	12.559	9.598	1.871	
Major Ions								
Chloride (mg/L)	06/04/01 - 08/30/01	grab	11	74.760	110.540	94.734	9.969	Equal or less than 250 mg/L
Sulfate (mg/L)	06/04/01 - 08/30/01	grab	11	27.770	77.380	58.221	14.480	
Sodium (mg/L)	06/04/01 - 08/30/01	grab	12	48.690	64.542	56.653	5.343	
Potassium (mg/L)	06/04/01 - 08/30/01	grab	12	5.069	7.442	6.687	0.744	
Calcium (mg/L)	06/04/01 - 08/30/01	grab	12	46.598	112.413	97.916	18.213	
Magnesium (mg/L)	06/04/01 - 08/30/01	grab	12	12.915	22.890	18.746	3.098	
Trace Metals								
Total Arsenic (µg/L)	06/04/01 - 08/30/01	grab	4	3.3	5.0	4.3	0.8	Less than or equal to 50 µg/L
Total Cadmium (µg/L)	06/04/01 - 08/30/01	grab	4	<0.3	<0.3	<0.3		Less than or equal to calculated value
Total Copper (µg/L)	06/04/01 - 08/30/01	grab	4	2.5	3.4	2.9	0.4	Less than or equal to calculated value
Total Iron (µg/L)	06/04/01 - 08/30/01	grab	4	175.6	476.3	287.2	137.4	Less than or equal to 300 µg/L
Total Lead (µg/L)	06/04/01 - 08/30/01	grab	4	<0.8	<0.8	<0.8		Less than or equal to calculated value
Total Zinc (µg/L)	06/04/01 - 08/30/01	grab	4	<4	<4	<4		Less than or equal to calculated value
Phytoplankton Indicators								
Chlorophyll a (µg/L)	06/04/01 - 08/30/01	grab	11	7.8	133.4	35.2	37.8	
Chlorophyll a2 (µg/L)	06/04/01 - 08/30/01	grab	11	5.3	116.3	29.8	34.0	
Chlorophyll b (µg/L)	06/04/01 - 08/30/01	grab	11	<1	4.8	1.2	1.3	
Chlorophyll c (µg/L)	06/04/01 - 08/30/01	grab	11	<1	13.8	3.4	3.8	
Pheophytin a (µg/L)	06/04/01 - 08/30/01	grab	11	3.4	21.7	7.1	5.1	
Carotenoid (µg/L)	06/04/01 - 08/30/01	grab	11	4.4	48.2	14.0	12.9	
Total Organic Carbon (mg/L)	06/04/01 - 08/30/01	grab	11	21.9	42.1	34.4	5.3	
Dissolved Organic Carbon (mg/L)	06/04/01 - 08/30/01	grab	11	18.3	41.6	33.9	6.3	

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Table 21a. Water Quality Data Summary at CUT1 for June 1, 2001 through September 21, 2001 .

Parameters	Period	Sample Type	n	min	max	avg	S.D.	FAC 62-302 Class I Criteria
Physical								
Temperature (°C)	06/04/01 - 08/30/01	grab	11	27.1	33.1	29.6	1.7	
Specific Conductivity (µmhos/cm)	06/04/01 - 08/30/01	grab	11	657	1112	864	137	Not greater than 50% above background or 1,275 µmhos/cm
Dissolved Oxygen (mg/L)	06/04/01 - 08/30/01	grab	11	3.0	8.4	5.2	1.8	Not less than 5.0 mg/L
Water pH (units)	06/04/01 - 08/30/01	grab	11	7.2	8.2	7.4	0.3	Not less than 6.0 or greater than 8.5 units
Turbidity (NTU)	06/04/01 - 08/30/01	grab	11	2.8	11.1	6.4	2.6	Less than or equal to 29 NTU above background
Secchi Disk Depth, meters	06/10/01 - 08/30/01	grab	9	0.4	1.0	0.6	0.2	
Color (PCU)	06/04/01 - 08/30/01	grab	11	32	177	107	42	
Total Suspended Solids (mg/L)	06/04/01 - 08/30/01	grab	11	4.4	18.4	8.4	4.3	
Total Dissolved Solids (mg/L)	06/04/01 - 08/30/01	grab	11	425.0	704.0	552.5	88.4	
Hardness (mg/L as CaCO3)	06/04/01 - 08/30/01	grab	12	194.3	381.3	302.6	56.1	
Alkalinity (mg/L as CaCO3)	06/04/01 - 08/30/01	grab	11	125.6	274.6	220.0	48.5	
Nutrients								
Total Nitrogen (mg/L)	06/04/01 - 08/30/01	grab	11	1.8	4.3	2.9	0.7	
Total Kjeldahl Nitrogen (mg/L)	06/04/01 - 08/30/01	grab	11	1.7	3.0	2.4	0.4	
Total Dissolved Kjeldahl Nitrogen (mg/L)	06/04/01 - 08/30/01	grab	11	1.3	2.9	2.0	0.4	
Nitrate+Nitrite as N (mg/L)	06/04/01 - 08/30/01	grab	11	0.028	1.282	0.516	0.432	
Nitrite as N (mg/L)	06/04/01 - 08/30/01	grab	11	0.007	0.108	0.043	0.029	
Nitrate as N(mg/L)	06/04/01 - 08/30/01	grab	11	0.021	1.174	0.474	0.407	Equal or less than 10 mg/L as N
Ammonium as N (mg/L)	06/04/01 - 08/30/01	grab	11	0.011	0.405	0.167	0.124	
Un-ionized Ammonia as NH ₃ (mg/L)	06/04/01 - 08/30/01	grab	11	0.001	0.014	0.004	0.004	Equal or less than 0.02 mg/L as NH ₃
Total Phosphorus (mg/L)	06/04/01 - 08/30/01	grab	11	0.045	0.196	0.083	0.043	
Orthophosphate as P (mg/L)	06/04/01 - 08/30/01	grab	10	0.005	0.040	0.019	0.013	
Total Dissolved Phosphorus (mg/L)	06/04/01 - 08/30/01	grab	11	0.013	0.051	0.027	0.012	
Silica (mg/L)	06/04/01 - 08/30/01	grab	11	6.395	14.979	10.809	2.857	
Major Ions								
Chloride (mg/L)	06/04/01 - 08/30/01	grab	11	69.590	122.810	98.039	13.881	Equal or less than 250 mg/L
Sulfate (mg/L)	06/04/01 - 08/30/01	grab	11	41.270	92.910	60.647	15.599	
Sodium (mg/L)	06/04/01 - 08/30/01	grab	12	39.017	83.865	61.289	11.664	
Potassium (mg/L)	06/04/01 - 08/30/01	grab	12	5.490	8.507	7.054	0.967	
Calcium (mg/L)	06/04/01 - 08/30/01	grab	12	48.495	113.773	91.276	18.833	
Magnesium (mg/L)	06/04/01 - 08/30/01	grab	12	12.064	24.551	18.247	3.822	
Trace Metals								
Total Arsenic (µg/L)	06/04/01 - 08/30/01	grab	4	3.1	5.7	4.2	1.1	Less than or equal to 50 µg/L
Total Cadmium (µg/L)	06/04/01 - 08/30/01	grab	4	<0.3	<0.3	<0.3		Less than or equal to calculated value
Total Copper (µg/L)	06/04/01 - 08/30/01	grab	4	1.9	2.7	2.3	0.3	Less than or equal to calculated value
Total Iron (µg/L)	06/04/01 - 08/30/01	grab	4	76.3	216.6	144.6	57.3	Less than or equal to 300 µg/L
Total Lead (µg/L)	06/04/01 - 08/30/01	grab	4	<0.8	<0.8	<0.8		Less than or equal to calculated value
Total Zinc (µg/L)	06/04/01 - 08/30/01	grab	4	<4	<4	<4		Less than or equal to calculated value
Phytoplankton Indicators								
Chlorophyll a (µg/L)	06/04/01 - 08/30/01	grab	11	11.8	167.7	44.2	44.1	
Chlorophyll a2 (µg/L)	06/04/01 - 08/30/01	grab	11	10.2	149.6	36.9	39.9	
Chlorophyll b (µg/L)	06/04/01 - 08/30/01	grab	11	<1	4.4	1.6	1.4	
Chlorophyll c (µg/L)	06/04/01 - 08/30/01	grab	11	<1	13.6	3.6	3.7	
Pheophytin a (µg/L)	06/04/01 - 08/30/01	grab	11	2.1	20.2	9.9	5.6	
Carotenoid (µg/L)	06/04/01 - 08/30/01	grab	11	5.0	56.8	16.4	14.3	
Total Organic Carbon (mg/L)	06/04/01 - 08/30/01	grab	11	21.1	39.4	32.8	6.5	
Dissolved Organic Carbon (mg/L)	06/04/01 - 08/30/01	grab	11	19.7	39.6	32.3	6.9	

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Table 21b. Water Quality Data Summary at CUT2 for June 1, 2001 through September 21, 2001 .

Parameters	Period	Sample Type	n	min	max	avg	S.D.	FAC 62-302 Class I Criteria
Physical								
Temperature (°C)	07/28/01 - 08/30/01	grab	3	31.8	33.6	32.6	0.9	
Specific Conductivity (µmhos/cm)	07/28/01 - 08/30/01	grab	3	805	1082	920	145	Not greater than 50% above background or 1,275 µmhos/cm
Dissolved Oxygen (mg/L)	07/28/01 - 08/30/01	grab	3	0.3	6.2	3.7	3.1	Not less than 5.0 mg/L
Water pH (units)	07/28/01 - 08/30/01	grab	3	7.1	7.9	7.4	0.4	Not less than 6.0 or greater than 8.5 units
Turbidity (NTU)	07/28/01 - 08/30/01	grab	3	3.5	6.7	5.3	1.7	Less than or equal to 29 NTU above background
Secchi Disk Depth, meters	08/17/01 - 08/30/01	grab	2	0.6	0.7	0.7		
Color (PCU)	07/28/01 - 08/30/01	grab	3	118	149	138	17	
Total Suspended Solids (mg/L)	07/28/01 - 08/30/01	grab	3	4.0	7.4	5.6	1.7	
Total Dissolved Solids (mg/L)	07/28/01 - 08/30/01	grab	3	527.0	676.0	594.3	75.5	
Hardness (mg/L as CaCO ₃)	07/28/01 - 07/28/01	grab	1			310.9		
Alkalinity (mg/L as CaCO ₃)	07/28/01 - 08/30/01	grab	3	217.7	303.6	251.0	46.1	
Nutrients								
Total Nitrogen (mg/L)	07/28/01 - 08/30/01	grab	3	2.6	3.2	2.8	0.4	
Total Kjeldahl Nitrogen (mg/L)	07/28/01 - 08/30/01	grab	3	2.3	2.5	2.5	0.1	
Total Dissolved Kjeldahl Nitrogen (mg/L)	07/28/01 - 08/30/01	grab	3	1.9	2.2	2.1	0.2	
Nitrate+Nitrite as N (mg/L)	07/28/01 - 08/30/01	grab	3	0.077	0.910	0.380	0.461	
Nitrite as N (mg/L)	07/28/01 - 08/30/01	grab	3	0.017	0.043	0.030	0.013	
Nitrate as N(mg/L)	07/28/01 - 08/30/01	grab	3	0.060	0.867	0.350	0.449	Equal or less than 10 mg/L as N
Ammonium as N (mg/L)	07/28/01 - 08/30/01	grab	3	0.018	0.082	0.047	0.032	
Un-ionized Ammonia as NH ₃ (mg/L)	07/28/01 - 08/30/01	grab	3	0.000	0.004	0.002	0.002	Equal or less than 0.02 mg/L as NH ₃
Total Phosphorus (mg/L)	07/28/01 - 08/30/01	grab	3	0.057	0.102	0.077	0.023	
Orthophosphate as P (mg/L)	07/28/01 - 08/30/01	grab	3	0.016	0.023	0.020	0.004	
Total Dissolved Phosphorus (mg/L)	07/28/01 - 08/30/01	grab	3	0.025	0.036	0.031	0.006	
Silica (mg/L)	07/28/01 - 08/30/01	grab	3	8.374	17.172	12.693	4.401	
Major Ions								
Chloride (mg/L)	07/28/01 - 08/30/01	grab	3	92.400	131.320	107.323	20.987	Equal or less than 250 mg/L
Sulfate (mg/L)	07/28/01 - 08/30/01	grab	3	47.770	48.680	48.370	0.520	
Sodium (mg/L)	07/28/01 - 07/28/01	grab	1			59.852		
Potassium (mg/L)	07/28/01 - 07/28/01	grab	1			6.110		
Calcium (mg/L)	07/28/01 - 07/28/01	grab	1			99.425		
Magnesium (mg/L)	07/28/01 - 07/28/01	grab	1			15.222		
Phytoplankton Indicators								
Chlorophyll a (µg/L)	07/28/01 - 08/30/01	grab	3	14.1	55.0	37.4	21.0	
Chlorophyll a2 (µg/L)	07/28/01 - 08/30/01	grab	3	8.3	45.3	29.8	19.2	
Chlorophyll b (µg/L)	07/28/01 - 08/30/01	grab	3	1.7	3.8	2.7	1.1	
Chlorophyll c (µg/L)	07/28/01 - 08/30/01	grab	3	1.4	5.1	2.9	1.9	
Pheophytin a (µg/L)	07/28/01 - 08/30/01	grab	3	9.2	13.5	11.0	2.2	
Carotenoid (µg/L)	07/28/01 - 08/30/01	grab	3	5.9	21.0	14.5	7.8	
Total Organic Carbon (mg/L)	07/28/01 - 08/30/01	grab	3	35.4	42.1	38.3	3.5	
Dissolved Organic Carbon (mg/L)	07/28/01 - 08/30/01	grab	3	34.7	42.8	38.5	4.1	

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Table 21c. Water Quality Data Summary at CUT3 for June 1, 2001 through September 21, 2001 .

Parameters	Period	Sample Type	n	min	max	avg	S.D.	FAC 62-302 Class I Criteria
Physical								
Temperature (°C)	06/04/01 - 08/30/01	grab	11	25.8	32.0	29.7	1.7	
Specific Conductivity (µmhos/cm)	06/04/01 - 08/30/01	grab	11	780	1157	960	103	Not greater than 50% above background or 1,275 µmhos/cm
Dissolved Oxygen (mg/L)	06/04/01 - 08/30/01	grab	11	1.4	9.5	5.0	2.6	Not less than 5.0 mg/L
Water pH (units)	06/04/01 - 08/30/01	grab	11	7.0	8.1	7.4	0.4	Not less than 6.0 or greater than 8.5 units
Turbidity (NTU)	06/04/01 - 08/30/01	grab	11	2.9	24.3	14.1	7.0	Less than or equal to 29 NTU above background
Secchi Disk Depth, meters	06/10/01 - 08/30/01	grab	10	0.3	0.9	0.5	0.2	
Color (PCU)	06/04/01 - 08/30/01	grab	11	80	144	110	21	
Total Suspended Solids (mg/L)	06/04/01 - 08/30/01	grab	11	2.8	45.0	19.9	13.9	
Total Dissolved Solids (mg/L)	06/04/01 - 08/30/01	grab	11	494.0	776.0	613.8	80.0	
Hardness (mg/L as CaCO ₃)	06/04/01 - 08/30/01	grab	12	281.7	431.9	344.5	41.7	
Alkalinity (mg/L as CaCO ₃)	06/04/01 - 08/30/01	grab	11	198.2	318.4	258.7	39.3	
Nutrients								
Total Nitrogen (mg/L)	06/04/01 - 08/30/01	grab	11	2.0	5.7	3.7	1.1	
Total Kjeldahl Nitrogen (mg/L)	06/04/01 - 08/30/01	grab	11	2.0	3.9	2.9	0.7	
Total Dissolved Kjeldahl Nitrogen (mg/L)	06/04/01 - 08/30/01	grab	11	1.6	2.7	2.2	0.3	
Nitrate+Nitrite as N (mg/L)	06/04/01 - 08/30/01	grab	11	0.041	1.843	0.788	0.603	
Nitrite as N (mg/L)	06/04/01 - 08/30/01	grab	11	0.011	0.135	0.066	0.044	
Nitrate as N(mg/L)	06/04/01 - 08/30/01	grab	11	0.029	1.747	0.721	0.566	Equal or less than 10 mg/L as N
Ammonium as N (mg/L)	06/04/01 - 08/30/01	grab	11	0.012	0.626	0.181	0.168	
Un-ionized Ammonia as NH ₃ (mg/L)	06/04/01 - 08/30/01	grab	11	0.001	0.009	0.003	0.002	Equal or less than 0.02 mg/L as NH ₃
Total Phosphorus (mg/L)	06/04/01 - 08/30/01	grab	11	0.052	0.366	0.122	0.092	
Orthophosphate as P (mg/L)	06/04/01 - 08/30/01	grab	11	0.006	0.059	0.025	0.018	
Total Dissolved Phosphorus (mg/L)	06/04/01 - 08/30/01	grab	11	0.013	0.067	0.032	0.018	
Silica (mg/L)	06/04/01 - 08/30/01	grab	11	8.730	22.064	13.657	3.875	
Major Ions								
Chloride (mg/L)	06/04/01 - 08/30/01	grab	11	94.040	128.850	104.712	9.659	Equal or less than 250 mg/L
Sulfate (mg/L)	06/04/01 - 08/30/01	grab	11	24.810	108.510	65.387	20.962	
Sodium (mg/L)	06/04/01 - 08/30/01	grab	12	54.029	73.595	63.886	6.087	
Potassium (mg/L)	06/04/01 - 08/30/01	grab	12	6.681	8.494	7.240	0.619	
Calcium (mg/L)	06/04/01 - 08/30/01	grab	12	74.272	114.961	97.111	11.737	
Magnesium (mg/L)	06/04/01 - 08/30/01	grab	12	20.514	35.174	24.831	4.513	
Trace Metals								
Total Arsenic (µg/L)	07/18/01 - 07/30/01	grab	4	4.5	4.9	4.7	0.2	Less than or equal to 50 µg/L
Total Cadmium (µg/L)	07/18/01 - 07/30/01	grab	4	<0.3	<0.3	<0.3		Less than or equal to calculated value
Total Copper (µg/L)	07/18/01 - 07/30/01	grab	4	2.6	3.5	2.9	0.4	Less than or equal to calculated value
Total Iron (µg/L)	07/18/01 - 07/30/01	grab	4	96.3	507.8	236.0	184.5	Less than or equal to 300 µg/L
Total Lead (µg/L)	07/18/01 - 07/30/01	grab	4	<0.8	<0.8	<0.8		Less than or equal to calculated value
Total Zinc (µg/L)	07/18/01 - 07/30/01	grab	4	<4	<4	<4		Less than or equal to calculated value
Phytoplankton Indicators								
Chlorophyll a (µg/L)	06/04/01 - 08/30/01	grab	11	6.9	332.3	83.5	109.9	
Chlorophyll a2 (µg/L)	06/04/01 - 08/30/01	grab	11	5.9	286.8	72.8	98.6	
Chlorophyll b (µg/L)	06/04/01 - 08/30/01	grab	11	<1	5.3	1.9	2.0	
Chlorophyll c (µg/L)	06/04/01 - 08/30/01	grab	11	<1	22.5	6.9	7.5	
Pheophytin a (µg/L)	06/04/01 - 08/30/01	grab	11	1.4	55.0	13.1	14.4	
Carotenoid (µg/L)	06/04/01 - 08/30/01	grab	11	2.8	128.9	32.4	40.4	
Total Organic Carbon (mg/L)	06/04/01 - 08/30/01	grab	11	28.6	42.0	35.1	4.6	
Dissolved Organic Carbon (mg/L)	06/04/01 - 08/30/01	grab	11	27.3	42.9	34.4	4.9	

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Table 22. Water Quality Data Summary at INT for June 1, 2001 through September 21, 2001 .

Station	Parameters	Period	Sample Type	n	min	max	avg	S.D.	FAC 62-302 Class I Criteria
BGINT	Physical								
	Temperature (°C)	06/04/01 - 08/30/01	grab	11	25.6	31.8	28.5	1.8	
	Specific Conductivity (µmhos/cm)	06/04/01 - 08/30/01	grab	11	775	1168	1005	112	Not greater than 50% above background or 1,275 µmhos/cm
	Dissolved Oxygen (mg/L)	06/04/01 - 08/30/01	grab	11	1.3	5.4	3.1	1.2	Not less than 5.0 mg/L
	Water pH (units)	06/04/01 - 08/30/01	grab	11	7.0	7.3	7.1	0.1	Not less than 6.0 or greater than 8.5 units
	Secchi Disk Depth, meters	06/10/01 - 08/30/01	grab	10	0.3	0.9	0.6	0.2	
	Color (PCU)	06/04/01 - 08/03/01	grab	9	96	165	125	21	
	Total Dissolved Solids (mg/L)	08/17/01 - 08/30/01	grab	2	492.0	657.0	574.5		
	Major Ions								
	Chloride (mg/L)	08/17/01 - 08/30/01	grab	2	99.010	124.790	111.900		Equal or less than 250 mg/L
	Phytoplankton Indicators								
	Total Organic Carbon (mg/L)	06/04/01 - 08/30/01	grab	11	30.3	43.5	36.6	4.4	
	Dissolved Organic Carbon (mg/L)	06/04/01 - 08/30/01	grab	11	30.7	44.2	36.8	4.9	
SBINT	Physical								
	Temperature (°C)	06/04/01 - 08/30/01	grab	11	27.3	32.5	29.8	1.4	
	Specific Conductivity (µmhos/cm)	06/04/01 - 08/30/01	grab	11	704	1035	891	110	Not greater than 50% above background or 1,275 µmhos/cm
	Dissolved Oxygen (mg/L)	06/04/01 - 08/30/01	grab	11	1.8	9.0	5.9	2.2	Not less than 5.0 mg/L
	Water pH (units)	06/04/01 - 08/30/01	grab	11	7.1	8.0	7.5	0.3	Not less than 6.0 or greater than 8.5 units
	Secchi Disk Depth	06/10/01 - 08/30/01	grab	10	0.3	0.9	0.6	0.2	
	Color (PCU)	06/04/01 - 08/30/01	grab	9	40	117	94	25	
	Total Dissolved Solids (mg/L)	08/17/01 - 08/30/01	grab	2	492.0	642.0	567.0		
	Major Ions								
	Chloride (mg/L)	08/17/01 - 08/30/01	grab	2	83.370	126.270	104.820		Equal or less than 250 mg/L
	Phytoplankton Indicators								
	Total Organic Carbon (mg/L)	06/04/01 - 08/30/01	grab	11	21.5	40.4	33.6	5.4	
	Dissolved Organic Carbon (mg/L)	06/04/01 - 08/30/01	grab	11	20.5	42.8	33.4	6.5	
PHINT	Physical								
	Temperature (°C)	06/10/01 - 08/30/01	grab	10	25.6	33.6	29.5	2.3	
	Specific Conductivity (µmhos/cm)	06/10/01 - 08/30/01	grab	10	602	988	745	110	Not greater than 50% above background or 1,275 µmhos/cm
	Dissolved Oxygen (mg/L)	06/10/01 - 08/30/01	grab	10	4.1	8.3	6.0	1.4	Not less than 5.0 mg/L
	Water pH (units)	06/10/01 - 08/30/01	grab	10	7.5	8.3	7.9	0.3	Not less than 6.0 or greater than 8.5 units
	Color (PCU)	06/10/01 - 08/03/01	grab	8	21	100	45	28	
	Total Dissolved Solids (mg/L)	06/17/08 - 08/30/01	grab	2	418.0	490.0	454.0		
	Major Ions								
	Chloride (mg/L)	06/17/08 - 08/30/01	grab	2	92.260	97.750	95.005		Equal or less than 250 mg/L
	Phytoplankton Indicators								
	Total Organic Carbon (mg/L)	06/10/01 - 08/30/01	grab	10	14.6	33.9	22.0	5.5	
	Dissolved Organic Carbon (mg/L)	06/10/01 - 08/30/01	grab	10	13.8	33.0	21.6	5.6	

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Table 23. Water Quality Data Summary at Rim Canals for June 1, 2001 through September 21, 2001 .

Station	Parameters	Period	Sample Type	n	min	max	avg	S.D.	FAC 62-302 Class I Criteria
RC1	Physical								
	Temperature (°C)	06/04/01 - 08/30/01	grab	11	26.5	32.2	29.0	1.8	
	Specific Conductivity (µmhos/cm)	06/04/01 - 08/30/01	grab	11	705	1186	994	146	Not greater than 50% above background or 1,275 µmhos/cm
	Dissolved Oxygen (mg/L)	06/04/01 - 08/30/01	grab	11	1.9	6.4	3.9	1.5	Not less than 5.0 mg/L
	Water pH (units)	06/04/01 - 08/30/01	grab	11	7.1	7.8	7.3	0.2	Not less than 6.0 or greater than 8.5 units
	Turbidity (NTU)	06/04/01 - 08/30/01	grab	11	5.6	18.0	10.5	3.1	Less than or equal to 29 NTU above background
	Secchi Disk Depth, meters	06/10/01 - 08/30/01	grab	10	0.4	0.9	0.6	0.2	
	Color (PCU)	06/04/01 - 08/30/01	grab	10	56	154	106	29	
RC3	Physical								
	Temperature (°C)	06/04/01 - 08/30/01	grab	11	27.0	31.5	29.6	1.4	
	Specific Conductivity (µmhos/cm)	06/04/01 - 08/30/01	grab	11	708	1062	889	119	Not greater than 50% above background or 1,275 µmhos/cm
	Dissolved Oxygen (mg/L)	06/04/01 - 08/30/01	grab	11	2.9	8.9	6.1	2.3	Not less than 5.0 mg/L
	Water pH (units)	06/04/01 - 08/30/01	grab	11	7.2	8.0	7.5	0.3	Not less than 6.0 or greater than 8.5 units
	Turbidity (NTU)	06/04/01 - 08/30/01	grab	11	5.0	25.1	9.9	6.1	Less than or equal to 29 NTU above background
	Secchi Disk Depth	06/10/01 - 08/30/01	grab	10	0.3	0.8	0.5	0.1	
	Color (PCU)	06/04/01 - 08/30/01	grab	11	42	144	102	32	
RC6	Physical								
	Temperature (°C)	06/10/01 - 08/30/01	grab	9	26.8	32.3	29.5	1.9	
	Specific Conductivity (µmhos/cm)	06/10/01 - 08/30/01	grab	9	349	824	613	148	Not greater than 50% above background or 1,275 µmhos/cm
	Dissolved Oxygen (mg/L)	06/10/01 - 08/30/01	grab	9	0.3	7.0	3.1	2.1	Not less than 5.0 mg/L
	Water pH (units)	06/10/01 - 08/30/01	grab	9	6.7	7.4	7.1	0.2	Not less than 6.0 or greater than 8.5 units
	Turbidity (NTU)	06/10/01 - 08/30/01	grab	9	1.6	10.2	6.9	2.7	Less than or equal to 29 NTU above background
	Secchi Disk Depth	06/10/01 - 08/17/01	grab	7	0.2	0.8	0.5	0.2	
	Color (PCU)	06/10/01 - 08/30/01	grab	9	82	556	209	178	
RC29	Physical								
	Temperature (°C)	06/04/01 - 08/30/01	grab	11	26.0	32.3	28.6	1.8	
	Specific Conductivity (µmhos/cm)	06/04/01 - 08/30/01	grab	11	790	1145	1019	108	Not greater than 50% above background or 1,275 µmhos/cm
	Dissolved Oxygen (mg/L)	06/04/01 - 08/30/01	grab	11	2.2	6.6	3.4	1.3	Not less than 5.0 mg/L
	Water pH (units)	06/04/01 - 08/30/01	grab	11	7.0	7.6	7.2	0.2	Not less than 6.0 or greater than 8.5 units
	Turbidity (NTU)	06/04/01 - 08/30/01	grab	11	4.0	16.4	8.5	3.2	Less than or equal to 29 NTU above background
	Secchi Disk Depth	06/10/01 - 08/30/01	grab	10	0.3	0.8	0.6	0.1	
	Color (PCU)	06/04/01 - 08/30/01	grab	11	92	160	123	21	

Figure B1.

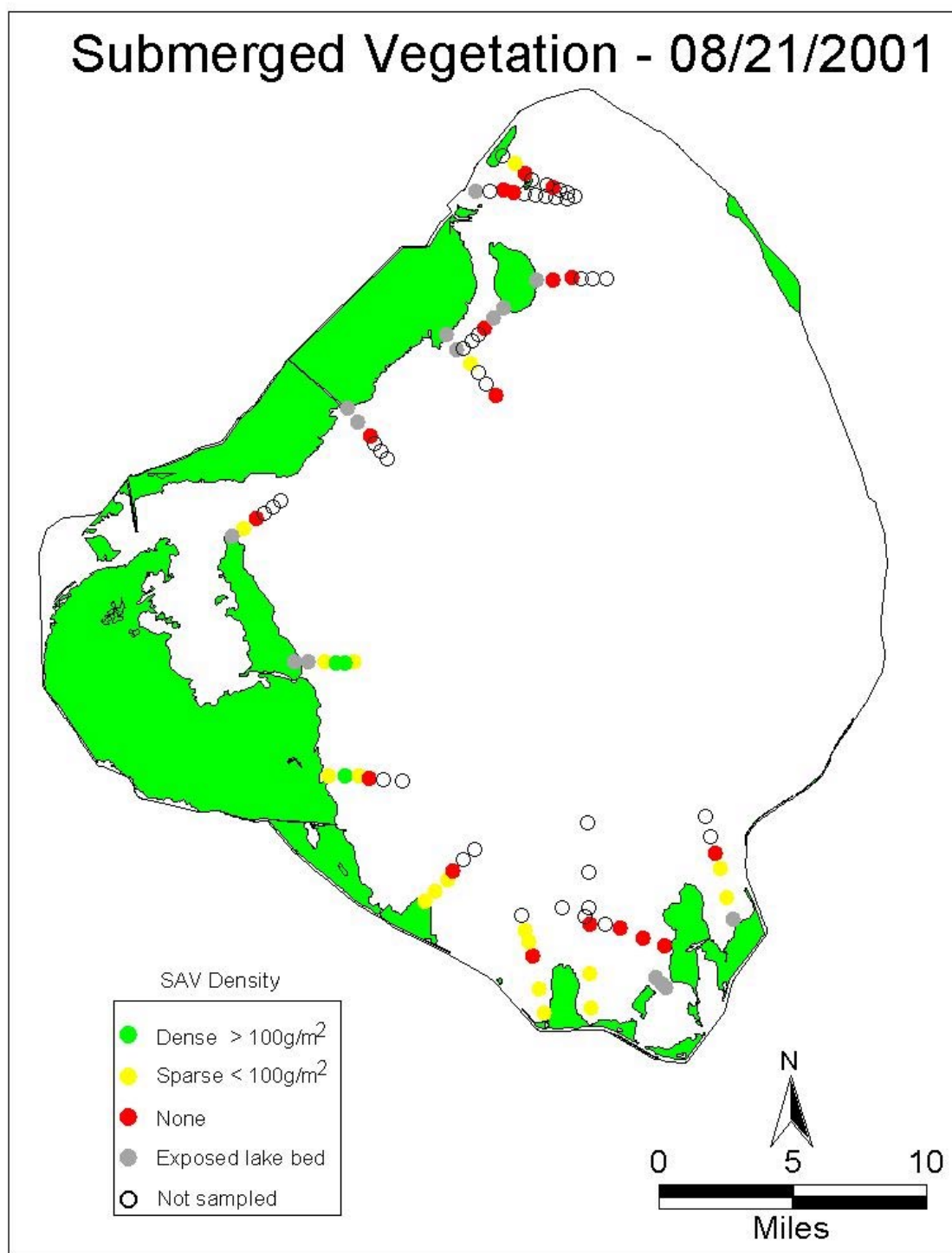


Figure B2.

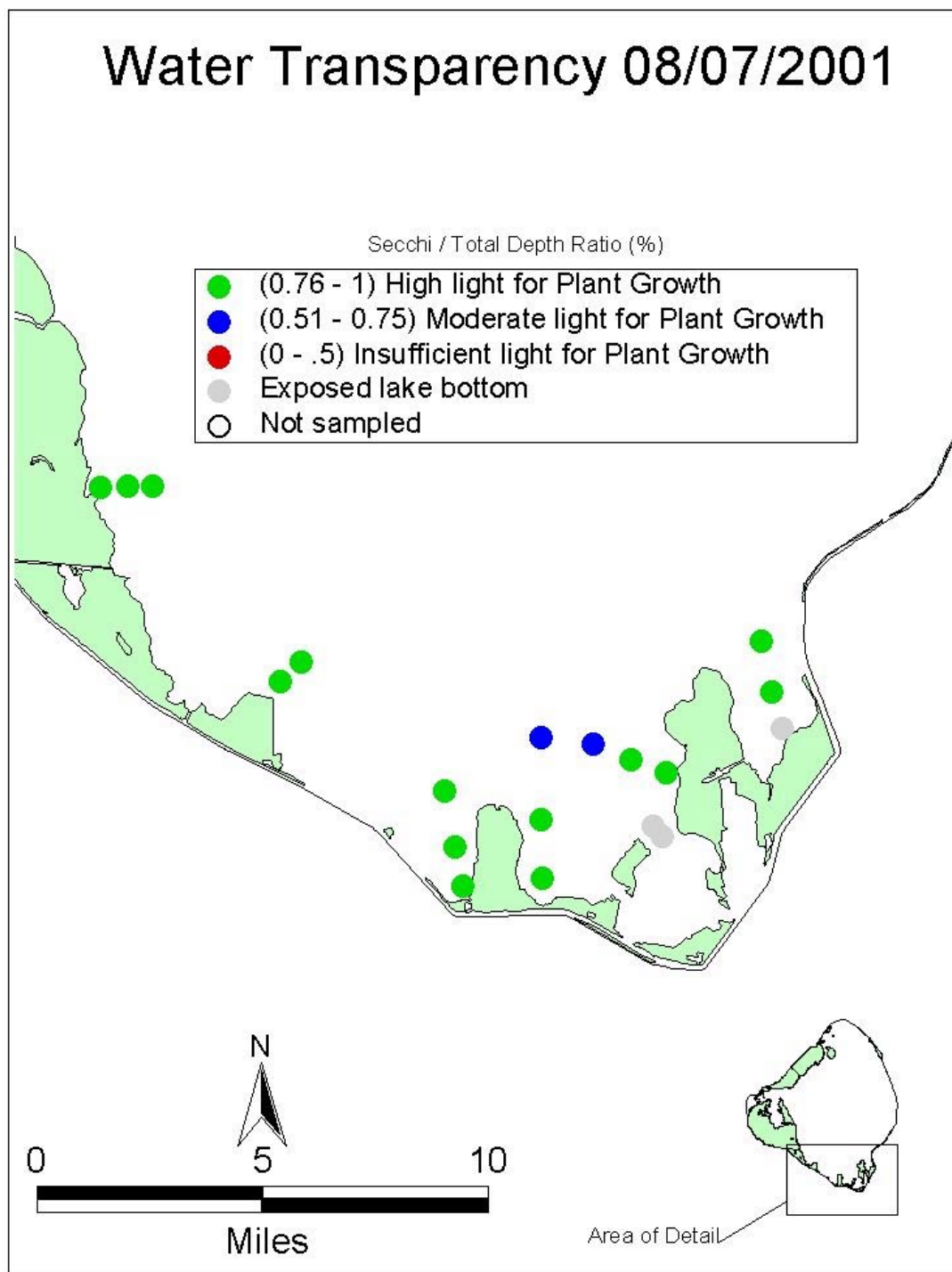


Figure B3.

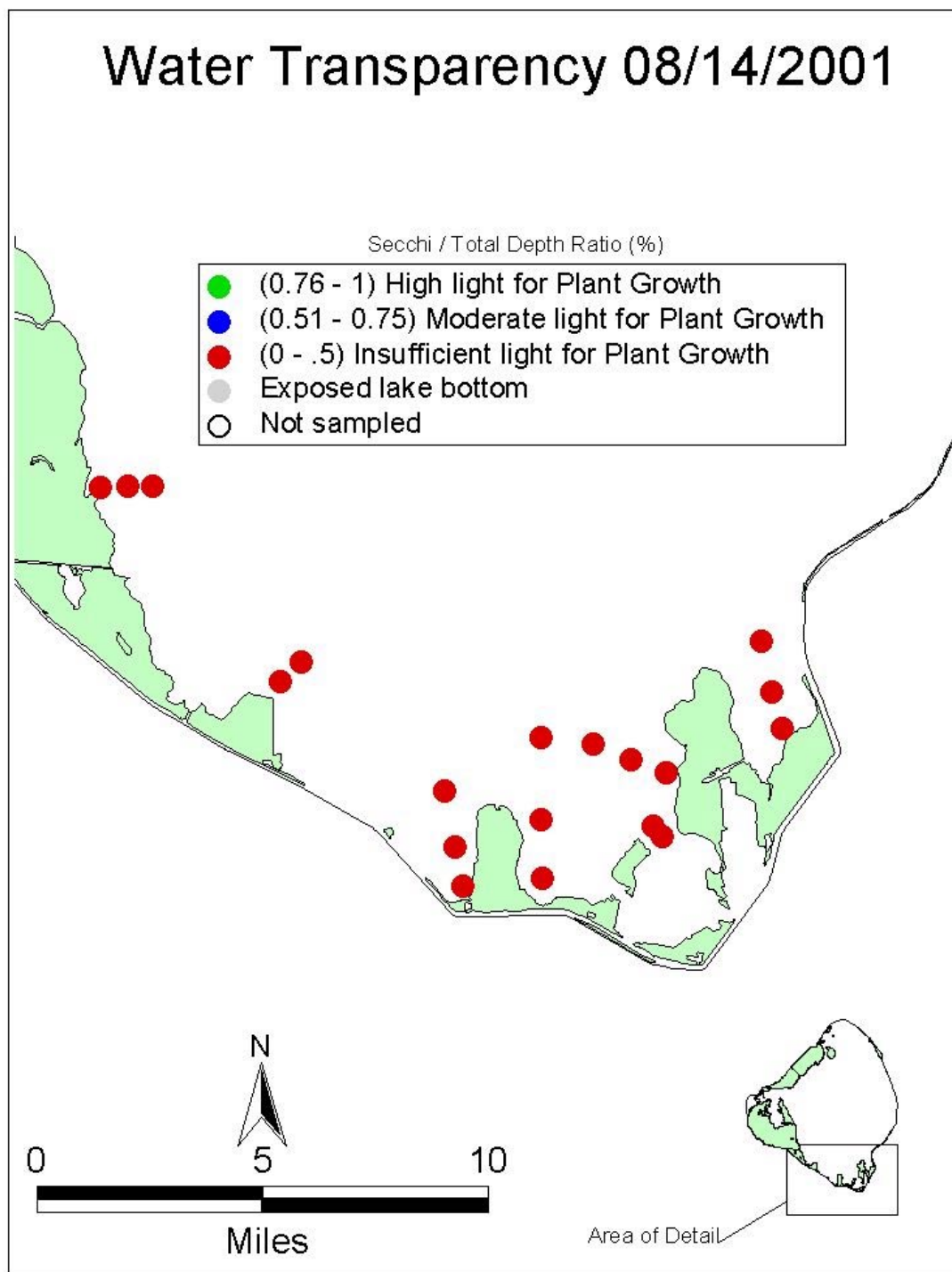


Figure B4.

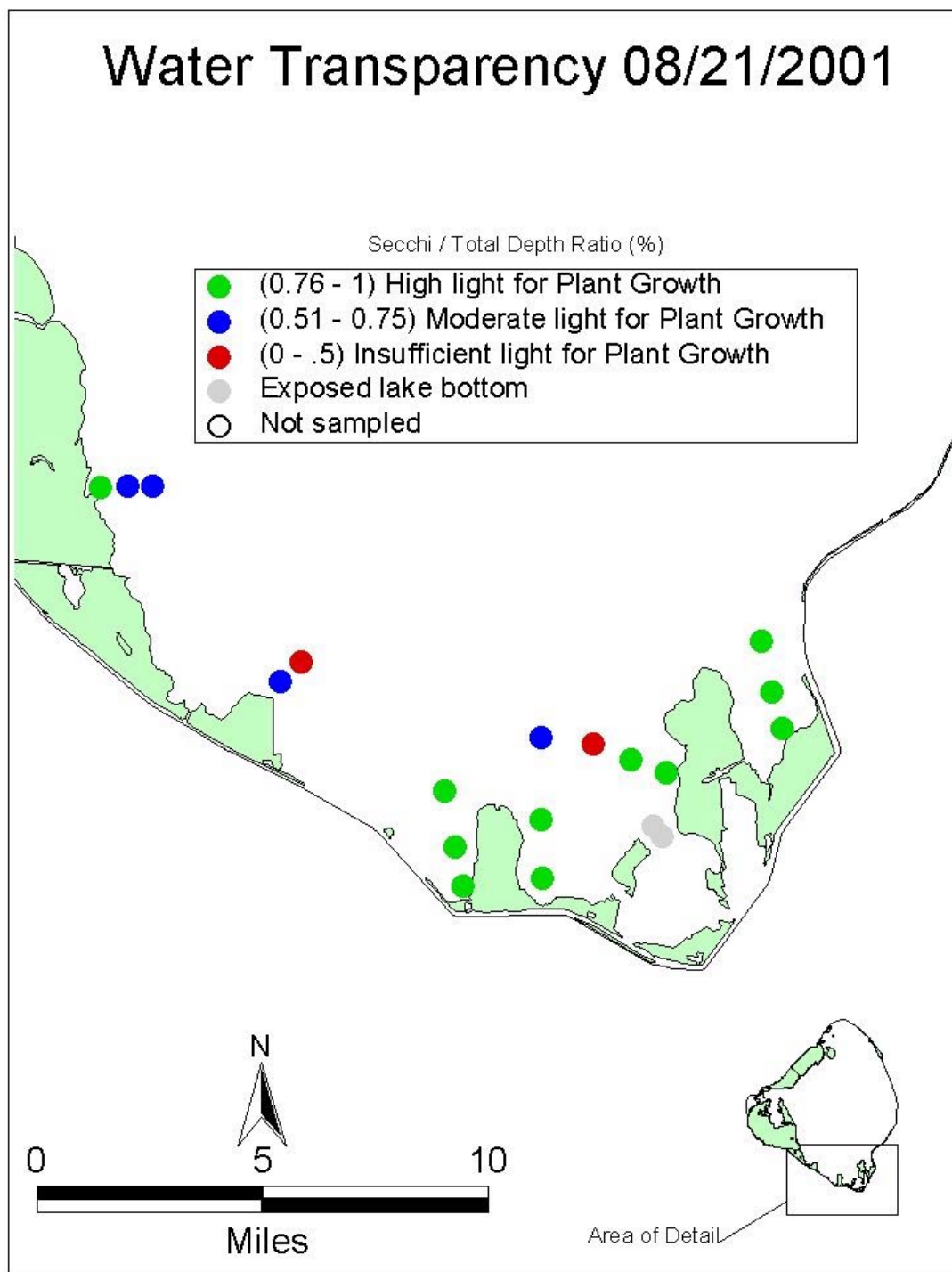


Figure B5.

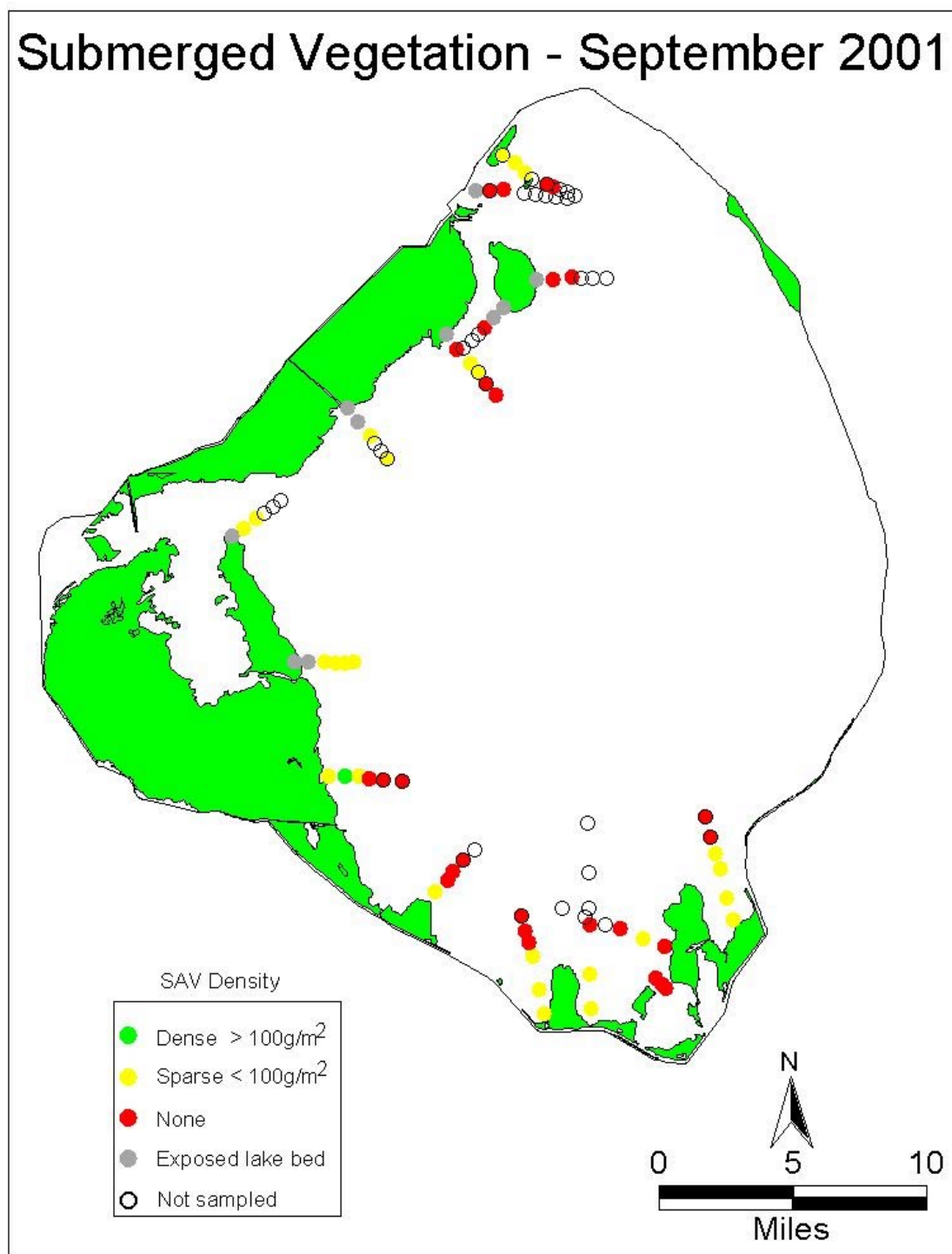


Figure B6.

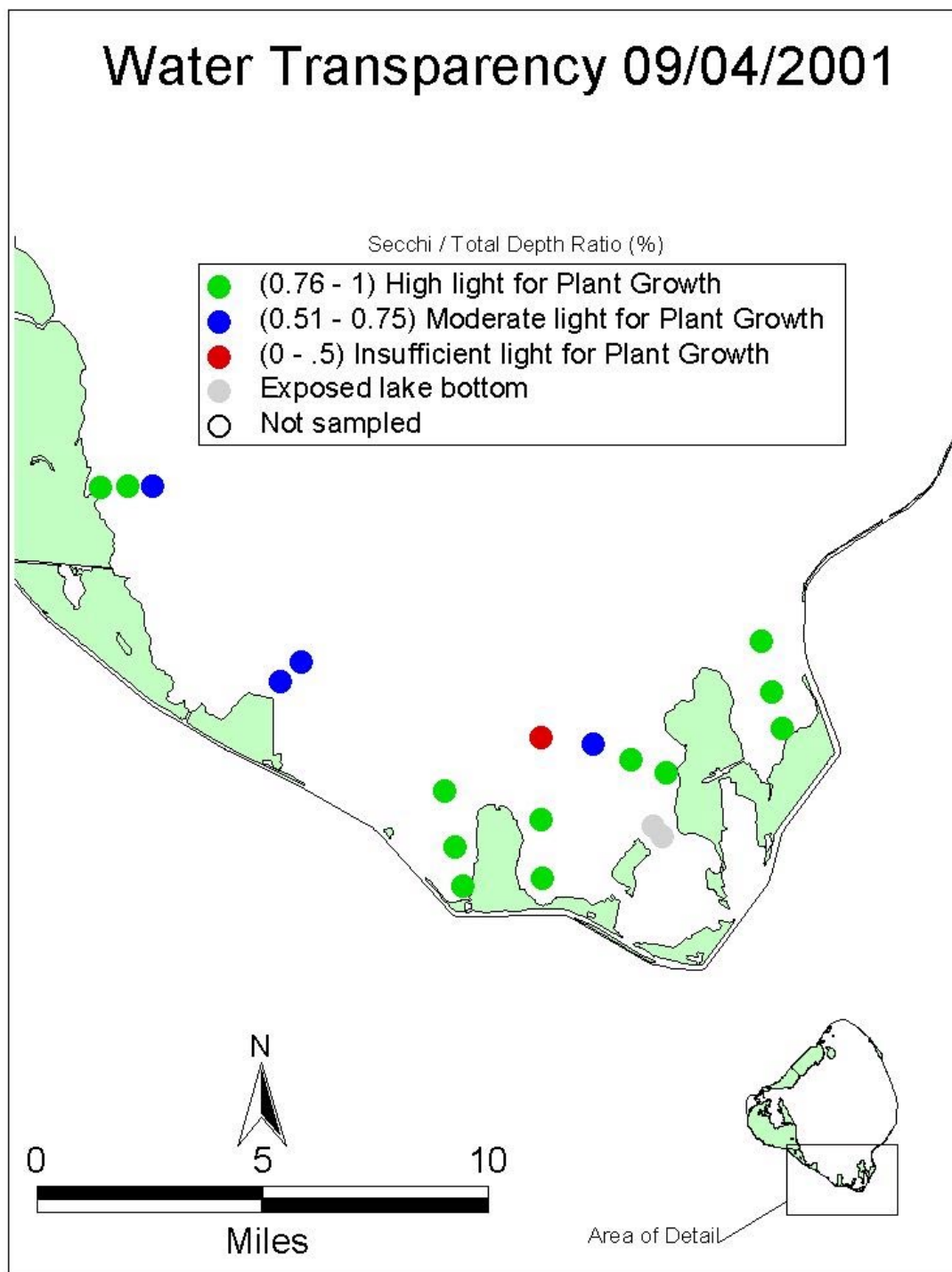


Figure B7.

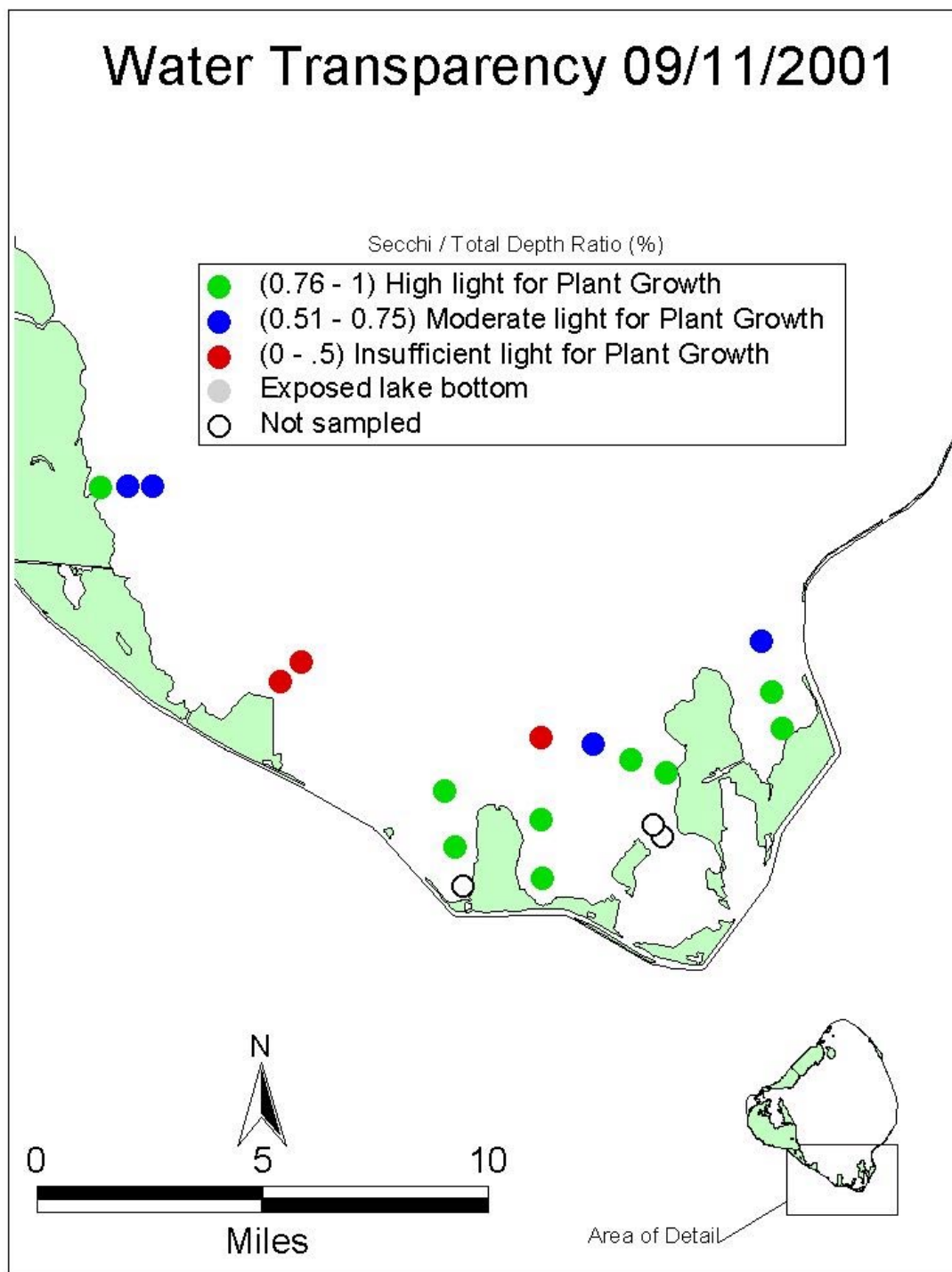


Figure B8.

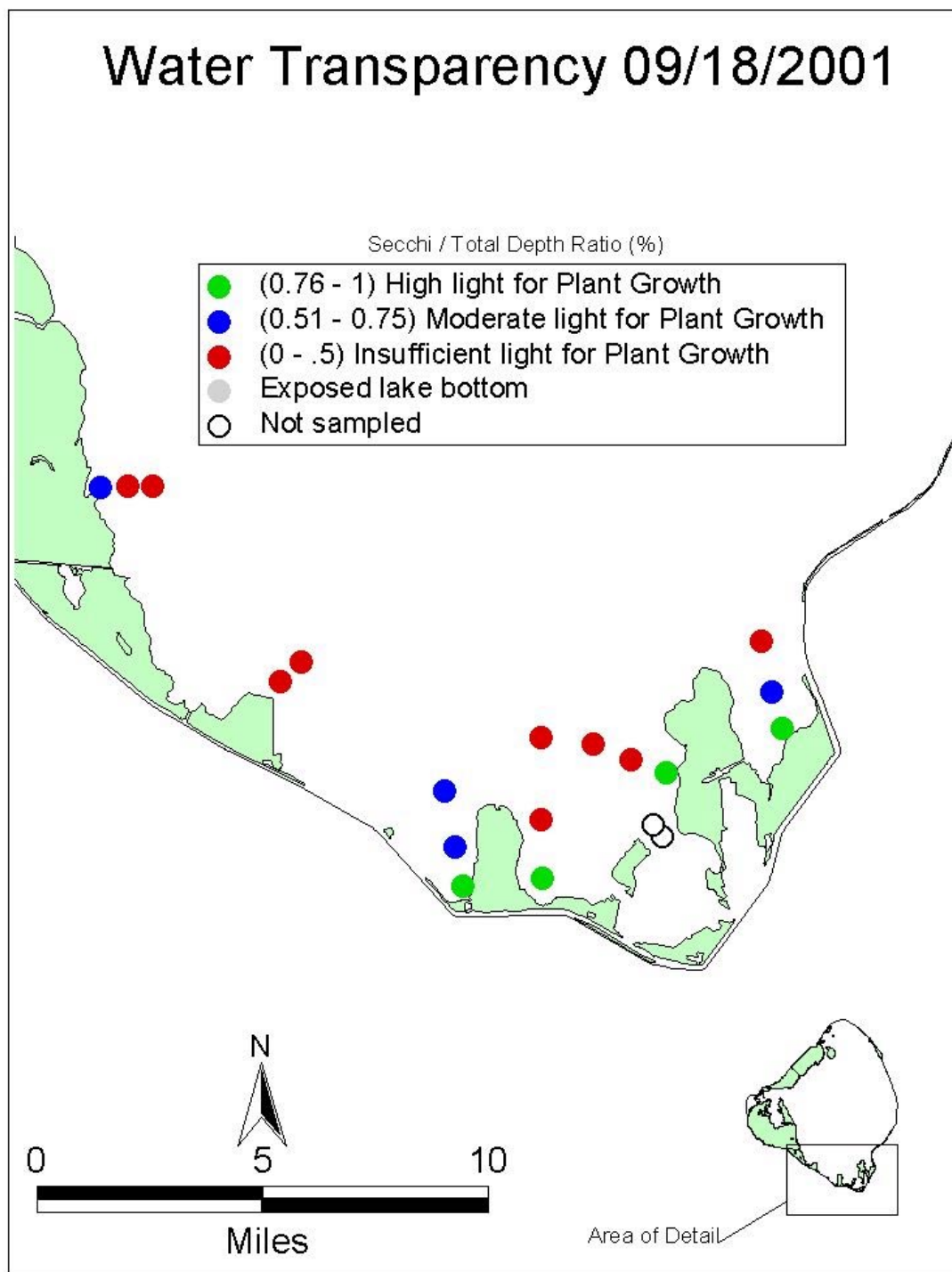


Figure B9.

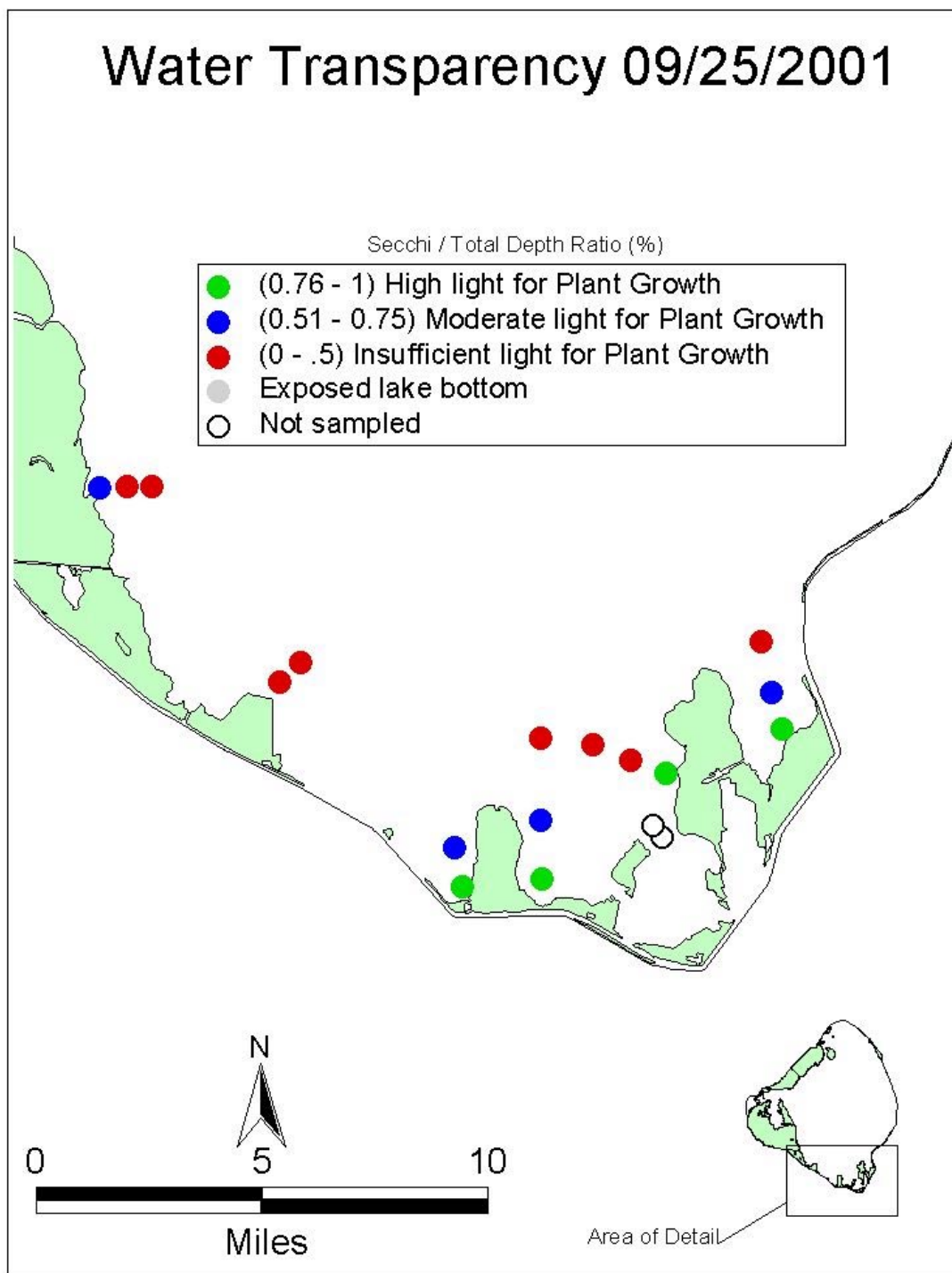


Table 24: Lake Recess Period (April 25, 2000 - June 30, 2000)
Outflow Volume and Total Phosphorus Load

note: TP load is calculated using interpolated values of grab measurements.

STRUCTURE	FLOW		TP LOAD	
	sum of cfs-days	acre-feet	kg	metric tons
S308	69142	137142	25802	26
L8 (at CULV10A)	5363	10638	1961	2
S352	38486	76336	12160	12
S351 (at S2)	80057	158791	20084	20
S354 (at S3)	50284	99737	12581	13
INDUSTRIAL CANAL	12702	25193	3420	3
S77	139420	276536	73792	74
total	395455	784373	149800	150

Gross flow-weighted-mean concentration (ppb) for the period : 155 ppb.